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Editorial

With a PC on almost every office desk and in a fair few homes too, it's easy to forget the business computer solution of only a few short years ago. Back then, most businesses and academic institutions featured huge, powerful servers and a large network of dumb terminals hungrily feeding off them.

I particularly remember my time at university, when the IT enthusiasts would wait until obscure times of the day when the traffic would be low and you could harness a significant percentage of the server's raw power. Surprisingly, this was usually in the mid-morning when most programmers were fast asleep following lengthy coding sessions the night before.

But then Microsoft and Intel came along and did a very good job of persuading us all to go for powerful standalone PCs on every desk. While this is an ideal solution for the home or small business, many larger establishments have suddenly stopped and asked themselves whether this is actually what they needed after all. The high cost of ownership and poor administrative control over desktop PCs have become big issues for big business, and ironically, many are considering a return to days gone by.

Of course, a dumb terminal doesn't have the marketing clout to survive in today's image-conscious world, so instead we have names like "Network Computer", "Windows Based Terminal" and of course "NetPC". And then there are the eSuites. Oh yes: none of your bloatware that we currently thrive on, but compact applications which often only install the bare portions you're after and no more.

Exciting? Yes. Confusing? Of course! That's why we thought it was about time to look at the subject of Network Computers in detail [*page 116*]. In this month's NC feature you'll also find a review of the latest version of NetWare and a preview of Windows NT 5.0, which is looking considerably more exciting than the increasingly delayed Windows 98.

If you're fed up with Microsoft and fancy something completely different for your Intel-based PC, how about the Be Operating System (BeOS), ideal for multimedia producers and reviewed in this issue [*page 128*]. Then again, if it's a PC you want, we have gathered together ten likely candidates [*page 140*], each costing £999 (ex VAT). Audio enthusiasts should check out our sound-card group test [*page 206*] and the Hands On Workshop [*page 232*] for setting up your own home studio.

Finally, it cannot have escaped your attention that this is our annual *PCW* Awards issue. Unlike many other magazines, we take your opinions seriously. Earlier this year we asked for nominations for your favourite and preferred hardware, software and services. As usual, the response was phenomenal, and the results are here in this issue [*page 176*]. You can be certain that the IT industry will be taking a very close look.

Gordon Laing, Managing Editor

Next Month

Celeron vs AMD and Cyrix

The great processor title-fight. We pitch Celeron against chips from AMD and Cyrix to discover which is the heavyweight champion and which is the quivering wimp.

Storage

If your hard disk is full to overflowing, or you just want a second copy of all those vital files, a removable cartridge drive is the answer. We test the best and tell you how to choose the right one.

PIMs and contact managers

You will need a contact manager to better organise your working life. We have eight contenders to cover your every need.

Plus...

We tell you what communications you need when setting up a small business, and give you the full story on Windows 98.

August '98 issue
On sale Thursday 25th June

** Next month's contents subject to change.*

Personal Computer World

July cover disc

July's CD has six featured titles for you to try, including three games and two excellent 3D packages. Plus a Software Library stuffed with over 30 utilities and applications, all presented with product info and preview information. Grab that CD to check out the latest and greatest!

Important notice

The publisher, VNU, has checked the *Personal Computer World* CD for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system which may occur while using either the disk or any software contained on it. If you do not agree with these conditions, you should not use the disk. It is good practice to run a virus checker on any new software before running it on your computer, and to make regular backup copies of all your important data.

Unless otherwise stated, all software contained on the CD is for demonstration only. This means it may be restricted in some way: for example, it may be time limited or have certain functions disabled.

How to use the CD-ROM

Quit existing applications. If you have 16Mb or more of memory you don't have to do this, but will still get better performance if not many other apps are running. Put the disk into your CD drive:

Windows 95 If you've got Windows 95, the *PCW* interactive loader will appear on your screen. If your CD doesn't autoload, go to Start/Run and type in **<CD Drive>:\pcw.exe**

Windows 3.1 From Program Manager choose File/Run, then type in **<CD Drive>:\pcw.exe** and press enter.

System requirements

You will need a PC with Windows 3.1 or later. Please check individual products for specific system requirements. For best results, run the CD on a Pentium PC with at least 16Mb of memory.

CD-ROM problems

The technical helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm, on **01274 736990**. If you experience problems with the CD-ROM, such as a message like "Cannot read from drive D:", please return the disk with a covering note detailing your name and address and clearly marked "PCW CD JULY 98", to:

TIB plc
TIB House
11 Edward Street
Bradford
BD4 7BH

A replacement disk will be sent to you by post.

Getting software on to the CD

Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disk. For cover-mount enquiries, please telephone Afshan Nasim on 0171 316 9761 or email afshan_nasim@vnu.co.uk.

Software Library

● Essential Utilities

Adobe Acrobat Reader 3 (Win 3.1/95) The free Adobe Acrobat Reader lets you view, navigate and print PDF files across all major computing platforms. (Fully functioning reader.)

GIF Construction Set 1.0Q (Win 3.1/95) The quickest and most professional way to create transparent, interlaced and animated gif files for web pages. (30-day shareware.)

DirectX 5.2 (Win 95) Latest set of essential video and audio drivers that are required to run some of today's processor-hungry games and applications. (Fully functioning drivers.)

***NEW EzDesk for Windows (Win95)** A utility that manages the desktop icons' layout. EzDesk can restore a desktop icons' layout to a previously saved arrangement. (Limited function shareware.)

Graphics Workshop 1.1Y (Win 3.1/95) Graphics Workshop is a superlative image management package that allows you to view, convert and catalogue your images in a wide variety of formats. (30-day shareware.)

Microsoft Internet Explorer 4.0 (Win 3.1/95) Surf the internet with the latest versions of Microsoft's Internet Explorer for Windows 3.1 and 95. (Fully functioning unregistered version.)

How to use the PCW CD

■ **Internet Explorer 4.0 Installation does not work from internet link**. After clicking the internet link, the option to install Internet Explorer 4.0 from the CD (if you do not have a browser already installed) will not work. To install IE4 you will have to run the installation manually:

Windows 95 Close down the CD program.

Go to START on the menubar and type: **<CD drive letter>:\SOFTWARE\LIBRARY\INTERNET\IE495\IE4SETUP.EXE**

Press OK, and the IE4 installation will start. Restart your machine and run the CD again. This time the CD program will detect that you have the browser installed and open the web pages.

Windows 3.1 Close down the CD program. From PROGRAM MANAGER select FILE\RUN. In the command line box type: **<CD drive letter>:\SOFTWARE\LIBRARY\INTERNET\IE4311\SETUP.EXE.** Press OK and the IE4 installation will start. Restart and run the CD again. This time the CD program will detect that you have the browser installed and open the web pages.

■ **Error message: "Program has performed an illegal operation"** after clicking QUIT on PCW CD main screen. This is a program error that occurs as the program closes down and has no effect on the CD program or your system.

CD-ROM Helpline 01274 736990

★ Software Library continues on page 17

Asymetrix 3D F/X

Creating 3D graphics has always been a bit daunting. Even after getting your head round the nuances of 3D design and animation, there are still the hours of frustration waiting for your ambitious creation to render. But with this FULL VERSION of Asymetrix 3D F/X, it's possible to create a 3D scene the first time you use the program. By dragging and dropping a 3D model from the catalog and adding a surface effect, lighting and shadows, you have a 3D scene immediately. The huge drag-and-drop libraries include hundreds of 3D models, customisable animation paths and different surfaces. By placing one of the customisable animation paths onto any object, you can watch it spin, rotate, and move in and out of the scene. It is even possible to wrap graphics (.BMP) and video (.AVI) files around the surfaces of models, and, by adding an audio (.WAV) file to your animation, you can really make it dance and sing.

YOU WILL NEED THIS SERIAL NUMBER TO INSTALL THIS PROGRAM: ASYM-PCW07

This will enable the installation only. You should ignore the request to register the software at the end of the installation process: the software will still work. It is recommended that you do a COMPLETE install and copy all files to your hard disk (requires 61Mb).

Personal Computer World Upgrade Offer

Upgrade to Asymetrix WEB 3D 2.0 for just £99.95 inc VAT & delivery (RRP is £128.07). 3D F/X, WEB 3D 2.0 lets you quickly and easily create 3D banners, bullets and 3D animated gifs and graphics for your web pages.

The program includes all the features of 3D F/X, plus an "easy learning" tutorial centre; lathe, spiral, tube, and curved text object 3D lathe tools; fire, wires, tiles, bend, taper, twist and melt special effects, and much more.

PCW Details

Operating system 80486/66 processor: Pentium recommended. At least 8Mb RAM. Windows 3.1/Windows 95 (Upgrade offer: Windows 95/NT)

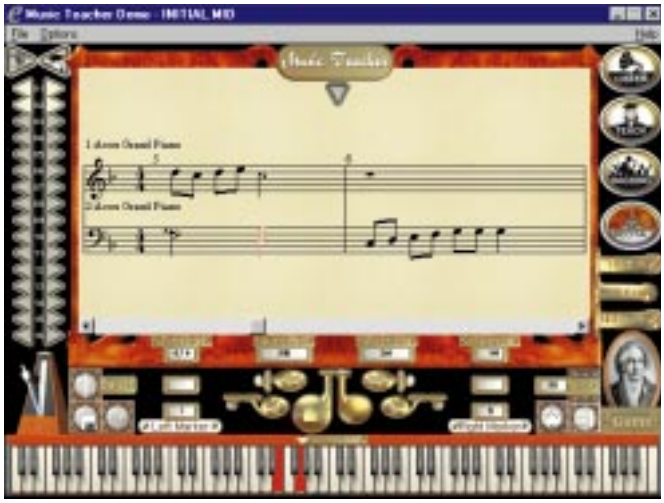
Limitations Full working version.

Sales contact 01923 208433

Technical support Not supported

Music Teacher

Music Teacher is designed to improve your musical ability by using both tests and games. The "Tests", for example, get you to tap out the rhythm of a song while the program automatically plays the correct notes for you, and tells you if you're playing ahead of, or after, the beat. Alternatively, you guess the notes you see on-screen and let the program tell you if you're playing too high or too low. It assesses every note you play during a song for left and right hands, to give you a percentage mark at the end. The "Game" screen consists of 12 one-bar tests and has four teachers to examine your playing. Mr Easy might give you full marks for your efforts, but the MIDI GURU will expect you to play every note "spot-on" before you'll get any mark at all! Music Teacher also has a Backing mode to play the backing track of a song while you jam the melody on top. A "loop" feature allows you to practise difficult sections over and over until you get them right, even slowing the tempo while you practise those awkward bits.



Recital mode can be used as a simple MIDI file player where all tracks will be played for you. If you like, you can flick through each track to see what's being played by any individual instrument.

Music Teacher is an intuitive teaching package which should improve your pitch and rhythm recognition in no time at all.

Ideally, you will need a MIDI controller or input device (normally a keyboard but possibly a MIDI guitar or MIDI wind controller) to use Music Teacher. Even without an input device, you can still enter music into Music Teacher by using the on-screen keyboard.

You will need a MIDI output device in order to hear the music. If you have a sound card, this will be included in its built-in sounds/wave table.

PCW Details

Operating system Windows 3.1/Windows 95

Limitations Function limited demo

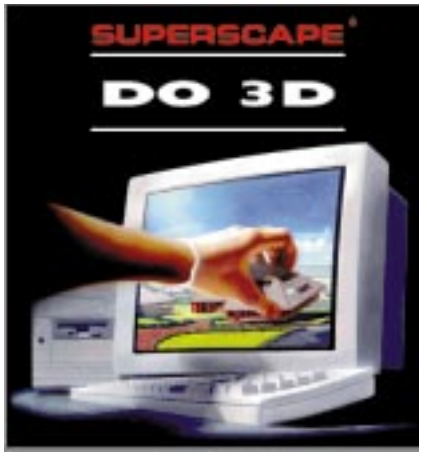
Sales contact 01525 372621

Technical support 01525 372621 between 9:30am & 5:30pm

CD-ROM Helpline 01274 736990

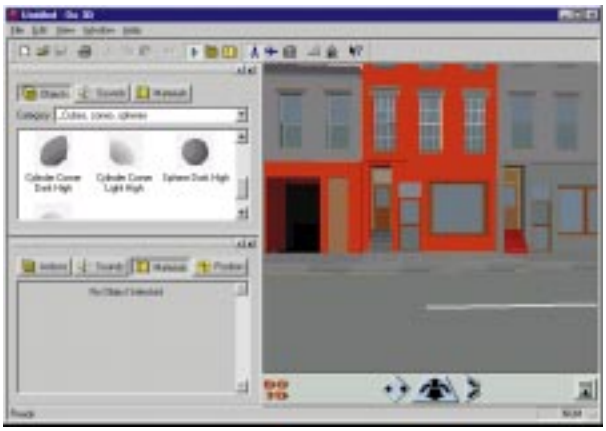
p16 >

DO 3D



With DO 3D you can go anywhere and make anything you can imagine: build a dark, moody street or a sinister dungeon, a beautiful garden with an ornamental lake, visualise your new office space before you order anything, or just convert your existing web site to 3D. The only limitations are the ones you impose yourself. The simplicity of use really make this both an entertaining and versatile desktop tool. Using drag-and-drop mouse control with the vast archive of virtual objects, in-built behaviours and sounds, and thousands of available textures, the user can instantly begin to build up a 3D world as simple or as complex as they want.

A 3D application is a useful and logical addition to other desktop creativity software, so DO 3D, which is developed from Superscape's top professional application, Webmaster, is a good place to start. Among some of its features is the opportunity to "sketch" in 3D, and create worlds that are fully interactive and filled with integrated images and sounds. DO3D outputs 3D worlds in the standard formats of SVR and VRML2.0.



DO 3D is perfect for a multitude of applications: planning room layouts and colour schemes, garden designs and building alterations, and of course to turn your personal or corporate web sites into 3D. As DO 3D was developed by the leading virtual reality software company Superscape, it has the flexibility and versatility you would not expect to find in home software. Alternatives are often highly-priced professional design tools, but this application gives the same quality of execution without the need for in-depth knowledge.

PCW Details

Operating system Windows 95
Limitations Function-limited demo
Sales contact 0500 600191
Technical support 01603 626860 between 9:00am and 5:00pm

Forsaken

Enter the world of Forsaken, a fast and furious journey through a merciless void of space where scientists playing with matter itself have completely devastated Earth and the solar system. The game is a free-for-all where every bounty hunter, mercenary, space pirate and free-booting scum in the galaxy takes up the unwritten right to raid the system and take anything the Theocracy, a horde of bloodthirsty cut-throats, don't want. You will be exploring underwater perils, penetrating deep into subterranean complexes and battling furiously. Astride roaring anti-gravity pioncycles with deadly arsenals, you will battle to the death against each other and the dead world's ruthless robotic sentinels. For the one who emerges victorious, the lost glories of a dead civilization await. For the rest, only agonising death. Weaponry ranges from futuristic submarines to robotic nuclear missiles. For the

best performance, a Pentium 133MHz or higher with D3D-compatible 3D accelerator card, or Pentium 166MHz without acceleration, both with 32Mb RAM, is recommended. You will need 50Mb of hard-disk space and DirectX 5 installed.

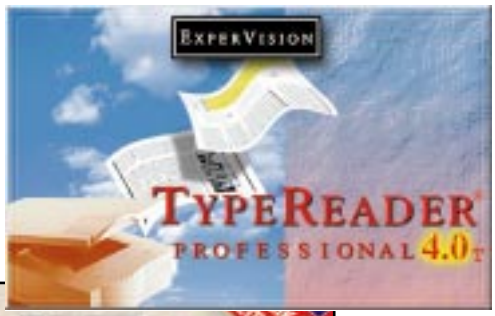
PCW Details

Operating system Windows 95
Limitations Shareware
Sales contact 0171 344 5000
Technical support 0171 344 5000

CD-ROM Helpline 01274 736990

★ Continued from page 14

Software Library



*NEW **Microangelo (Win 95)** Browse, manage, create, and edit Windows 95 icons from 8x8 to 64x64 pixels in size and up to 256 colours. Explorer-like Browser specialises in locating icons on your system. (30 day trial.)

MIRC 5.31 (Win 3.1/95) Provides a user-friendly interface for use with the Internet Relay Chat network. The IRC network is a virtual meeting place where people from all over the world can meet and talk. (30-day shareware.)

*NEW **Net Toob (Win 3.1/95)** Enables playback of online streamed or offline downloaded MPEG-1, Video for Windows (AVI), QuickTime for Windows (MOV), QuickTime VR "object" files, Autodesk Animations (FLC/FLI), WAV audio and MIDI audio. Works with multiple browsers.

Paint Shop Pro 3.11 (Win 3.1) Fully-featured painting and image-manipulation program. Features include powerful painting tools, photo retouching, image-enhancement functions, batch file format conversion, and support for over 30 different file formats. (30-day shareware.)

*NEW **Paint Shop Pro 5.0 (Win 95)** The latest version of this popular graphics editor, with powerful features: complete layer support, Picture Tube brushes, CMYK separations and pressure-sensitive tablet support. Includes enhancements to flexible painting and retouching brushes, and adjustable cropping and selection tools.

SpellWrite for Windows 1.6/2.1 (Win 3.1/95) A unique utility that can spell-check any Windows program instantly (email, accounts, database etc.) from a designated hotkey. It has an 85,000-word dictionary in UK format. (30-day shareware.)

WinZip SR 6.3 SR-1 (Win 3.1/95) Industry-standard compression/decompression utility for Windows 3.1 & 95, with automatic built-in disk spanning support for multi-disk Zip files. (21-day evaluation version.)

● New This Month

Anoid (DOS) Anoid is a colourful and addictive clone of Breakout, the bat, ball and bricks classic. (Ten-level demo.)

Calmira (Win 3.1 only) Calmira upgrades your Windows 3.1 user interface, bringing features that Windows 95 users have long been enjoying. (Freeware with source code.)

Clipboard Charlie Handy multi-layered text clipboard utility. (Shareware function-limited demo.)

Cubase Score VST (Win 95) Steinberg's Virtual Studio Technology creates a music-production powerhouse with up to 32 tracks of CD-quality digital audio and up to 128 real-time equalisers. Two professional effect racks, each with 4 totally independent effect slots, and much more. (Save-disabled version.)

Desktop Wallpaper (Win 95) Desktop Wallpaper allows you full control over your background wallpaper in Windows 95. (30-day trial.)

Directory Magic (Win 95) A powerful directory/file manager to help you organise your files & directories with ease. (30-day test-drive.)

Dr Schueler's Medical Adviser (Win 3.1/95) Interactive medical diagnosis plus information on drugs, injuries, diseases, poisons, health & diet. This month's offer for *PCW* readers allows you to take advantage of a special upgrade from Health Perfect for Dr. Schueler's Medical Adviser (UK) v2.0 for only £29 (RRP £49). Offer ends 31st July 1998. (Full working version.)

England Football Manager (DOS) Manage a football team in the lowly English divisions and take them to the top of the league, in this football management sim. (Function-limited demo.)

Italian Football Manager (DOS) Take charge of a football team in the tough Italian leagues and manage them to the top, in this football management sim. (Function-limited demo.)

JPEGView (Win 95) Windows 95 viewer for JPEG picture files. It is designed for quickly viewing pictures without a lot of filename selecting and clicking of buttons. (Freeware.)

Language Labs Russian (Win 3.1/95) Fully presented in the target language, Language Labs evolved from the successful Rosetta Stone language courses. (Limited demo.)

Macro Scheduler (Win 95/NT) A powerful scheduling and macro scripting tool. Scripts can be built to control any program or command which accepts keyboard and mouse input. A real lifesaver. (30-day evaluation.)

Process 98 (Win 95) Mapping flexibility of flowcharting software with a powerful simulation engine. Model any business process, from claims processing to financial transactions to the most challenging manufacturing design. (14-day time-limited demo.)

Project Scheduler 7 (Win 95/NT) Desktop business task scheduling. Project Scheduler 7 offers unique solutions to real-world scheduling challenges. (14-day time-limited demo.)

Report Maker (Win 95/NT) Report Maker allows teachers to create pupil reports and Record of Achievements (ROA). The reports are generated from a customisable "database" of statements. (Freeware).)

Talk Now (Win 3.1/95) EuroTalk language-learning discs help you understand and speak a new language. By hearing and practising authentic everyday speech, your natural ability for language will develop. This demo features Chinese, Polish, Portuguese, Irish, Russian and Italian. (Limited demo.)

Tiles (Win 3.1/95) A tile stacking game similar to the arcade classic, Klax. (10 level demo.)

TypeReader Workstation (Win 95) Several modules provide full optical character recognition (OCR) and entry-level document management facilities. (Save-disabled demo.)

UK Workforce (Win 95) Personnel management system with full report-writing facility. (30-day trial version.)

OS/2 Warp 3.0 Fix Pak #35

OS/2 Warp Fix Pak #35 for Warp 3.0 can be found in the **/handson/os2/warp3** sub-directory. This is the latest fix pack for Warp 3, released on 20th April 1998.

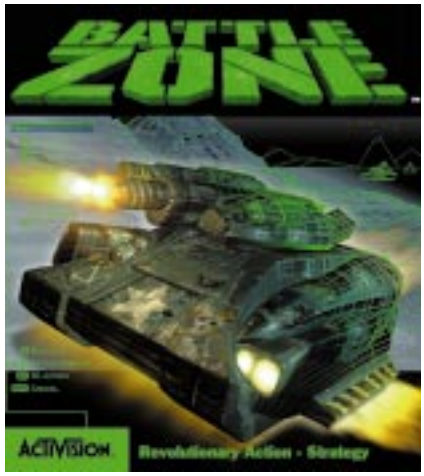
Please read the README.1ST file for important pre-installation information. We have included a utility, FASTKICK.ZIP, created by Dmitry Niqiforoff, which allows the Fix Pack to be installed from a hard disk. More information can be found in the regular Hands On OS/2 column [*page 275*].

DOSCALL fixes for Warp 3 and Warp 4 are included. The Warp 3 version is with Fix Pak #35 and the Warp 4 version in the FP6FIX.ZIP file in the **/handson/os2/warp4** sub-directory. This only affects you if you use the DESKMAN/2 program, but should probably be applied for consistency anyway if you have applied the Fix Paks.

CD-ROM Helpline 01274 736990

p18 ➢

Battlezone



The original Battlezone of the eighties was the first 3D computer game ever. Activision presents the next revolutionary Battlezone: an immersive first-person, action-strategy game where you command your troops from the battlefield. Battlezone is based around an alternative and "unpublicised" story behind the Space Race. American and Soviet scientists have discovered an off-world bio-metal that can be used to manufacture amazing

vehicles and weapons. But they each need to be the first to find additional bio-metal deposits in deeper space. As only one superpower can survive in the Battlezone, the *real* Space Race has begun.

An interesting array of hardware is at your disposal, notably 20 anti-gravity war machines equipped with weapons of destruction including mortars, mines, and a devastating Thumper Device which sets off massive earthquakes over the morphable terrain. Other features include 3D warfare, strategic control, first-person combat action and actual images from NASA space expeditions. Multiplayer gaming is possible via LAN, modem or internet. This game requires DirectX 5 (included with the installation) or later. You will need plenty of disk space too: 160Mb of uncompressed hard-drive space for game files and 50Mb for the Windows swap file. If you have a 3D graphics card, the game uses Microsoft's Direct 3D to support 3D hardware acceleration.

PCW Details

Operating system Windows 95

Limitations Function-limited demo. (The level has been especially created for the demo.)

Sales contact 01895 456700

Technical support 0990 143525 between 9:30am and 5:30pm

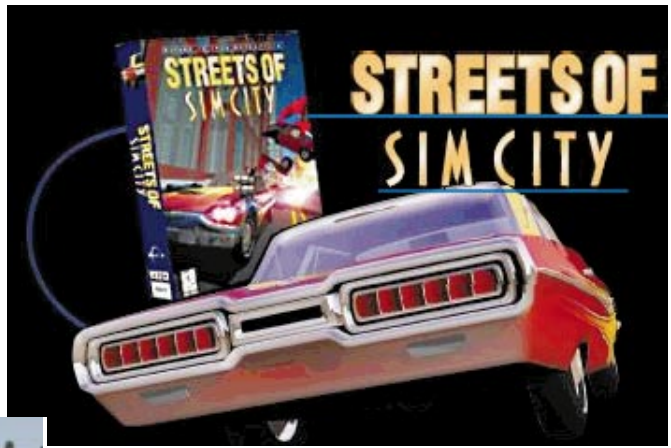
Streets of SimCity

This demo of Streets of SimCity offers only two menu options — New Game and Player's Choice. Starting a New Game, you are dropped into an example city from SimCity 2000 populated with easy-level Hunter and Cop cars who pursue you relentlessly. Player's Choice starts you out in the same example city but without the enemy cars annoying you, as you take a leisurely Sunday drive through the streets.

Your hardware includes one machine gun and one missile launcher, and additional ammunition is picked up randomly along the road.

The fun in this game is that you can speed through one of 50 built-in SimCity 2000 cities, or import your own. You can create an unlimited number of urban raceways with the STREETS course editor and battle through your new city with oil slicks, missile launchers, machine guns and mine droppers. There are 25 add-ons including radar detectors, high-performance tyres, armour and hoppers. There are different driving storylines and missions, ranging from car combat to urban drag races. You can choose a vehicle from a range of five including muscle cars, sports cars and trucks.

You will need 25.4Mb of hard-disk space. The game supports 3DFX and DirectX-compatible joysticks, and internet, modem and LAN play with relevant connections.



PCW Details

Operating system Windows 95

Limitations Function-limited demo

Sales contact 01753 546465

Technical support 01753 546465 9am-5pm weekdays.

CD-ROM Helpline 01274 736990

ClaraNET

ClaraNET offers full internet access, including email, the web and newsgroups. All the programs you need are included as part of the Atlantis software.

Packages include free 24-hour technical support, 100 percent local call access in the UK, no connection or start-up fee and free technical help. ClaraNET supports both K56 Flex and US Robotics X2 technologies, and you get 25Mb of web space free with your account.

The Atlantis software includes a licensed copy of Atlantis Mail and News. Try ClaraNET FREE for a month, and if you decide to continue you will be billed at the end of your trial month. *Please read the Terms and Conditions online.*

PCW Details

Operating system Windows 95 and 3.1
Limitations One month free
Contact (Account Enqs.) 0171 903 3000
Technical Support 0845 060 1000

AOL

Easy-to-use internet online service FREE this month with 50 hours online time! AOL covers everything from the latest News & Sports to Travel & Entertainment. Make net access easy: go directly to web pages from your AOL menu bar. AOL offers 33.6k access speeds nationwide and has Internet Explorer 3.0 integrated as its main browser. 350,000 UK subscribers can't be wrong!

- 50 hours online and one month's AOL membership!
- Five email addresses!
- Free technical support!
- 10Mb of web space!
- 100 percent local call access!

Run the software from the main screen or from the Software Library ISP section.

PCW Details

Operating system Windows 95 and 3.1
Limitations One month free membership. 50 free online hours.
Contact 0800 376 5432

CD On Line

Clicking on the web link banner at the top of the main screen gives you the chance to run your browser and access *PCW* CD OnLine. CD OnLine is a new section of the CD giving you up-to-date access to sites and information relating to the content on this month's CD. Besides direct links to the *PCW* web site, vnunet.com and Jobworld.co.uk, you will find a directory linking you to the web sites of the companies which have software included on this month's CD, a continually updated Technical Info page, and a preview of next month's CD. There's also contact information and online subscription.

Jobworld.co.uk is a free service which gives you access to thousands of new IT, business and finance vacancies every day. All you have to do is browse the site by job sector or search on a specific set of job skills or requirements.

The Jobworld Email Alert service offers extra freedom by sending only details that match the job-seeker's preferences, letting the recipient control what information is sent and when.

Jobworld also offers links to job sites overseas, a guide to IT contracting, and comprehensive lists of jobs from the top recruitment agencies in the UK.

Jobworld.co.uk: be the first to know!

Vnunet.com offers speed of delivery, accuracy and breadth of coverage from five market-leading weekly newspapers — Computing, Accountancy Age, PC Dealer, Network News and PC Week, generating up to 50 stories every working day. With correspondents in Europe, the US and Asia contributing daily to the VNU Newswire, a round-the-clock news service is available at vnunet.com.

Detailed information is available from in-depth articles, news analysis and product reviews from VNU's stable of monthly publications, including *Personal Computer World* and *Management Consultancy*.

CD-ROM Helpline 01274 736990

Newsprint

New Winchip piles pressure on Intel

Pictured below is a new IDT Win chip which tightens the screw on Intel's criticised low-end Celeron, already under pressure from AMD and Cyrix chips.

PCs using the first Winchip C6 are already on sale. Evesham has models starting at £459 (ex VAT). The chips are optimised for standard Windows use for the home and small office.

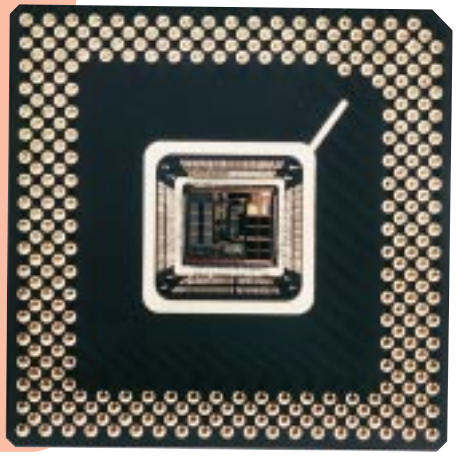
The new Winchip 2, available as samples now and expected to be in PCs by July, will have twice the MMX performance and better floating-point processing, bringing it to within ten percent of the equivalent Intel chip.

It uses the old System 7 socket but with the latest 100MHz bus. First 0.35 micron versions will clock 200MHz, 225MHz or 240MHz. Later this year, 0.25 micron versions will clock up to 333MHz.

IDT plans a 3D-enhanced C6 aimed at games players later this year.

IDT is less well known than other cloners, but it's big. With three chip fabs and a deal with IBM for the manufacture of more chips, it will ship up to three million processors this year.

Evesham 0800 496 0800; IDT 01372 363399



Imminent NT 5.0 steals the Win98 launch show

Microsoft was due as we went to press to ship the first copies of Windows 98 to PC makers, still unsure whether the full launch of the new OS could go ahead on 25th June.

Justice Department (DoJ) and Microsoft officials were said to be seeking a compromise over whether Windows 98 is covered by an order that Microsoft must decouple its Explorer browser from Windows 95. Windows 98, in effect, *is* a browser. It maps the internet and your local disks through the same Explorer interface.

But Microsoft is not out of trouble even if it wins that point. Thirteen states were threatening action, and the DoJ was said to be broadening its remit to cover license issues and Microsoft's spat with Sun over the future of Java. The Windows 95 launch three years ago was preceded by a similar legal cliffhanger, but the resemblance ends there.

Windows 98 features have been creeping into Windows 95 patches and vendor releases. Many businesses are focusing more on Windows NT, which has a major revamp coming in version 5.0 and is Microsoft's platform for the future. Microsoft's Paul Maritz, platforms group VP, said in London that a full-featured beta of NT 5.0 will be shipped about June. He said the rush for '98 upgrades was expected to be less in percentage terms than with '95. But numbers will be bigger because more people now have PCs.

Asked if Microsoft could decouple browser functions from Windows 98 if required by the courts, Maritz said: "We could be ordered to do anything, but the results would be bizarre."

Martin Gollogly, senior analyst at Datamonitor, thinks '98 offers little to attract the average home or office '95 user to upgrade. "About 400,000 starters in Britain will buy PCs with Windows 98."

Windows 98 costs £161.50 (inc VAT) or £85 as an upgrade from '95 or 3.x.

Clive Akass and Susan Pederson

Mystery as PC infra-red ports go out of sight

The great infra-red mystery has deepened with the latest round of PC launches. Regular Newsprint readers will be familiar with the puzzle. Consider the facts:

- Most new notebooks and palmtops have I-R for fast (up to 4Mbit/sec) cordless data links.
- Nearly every TV sold has I-R remote control bundled.
- Most motherboards sold have two pins for I-R support. Windows 95 has I-R drivers.
- I-R transceiver chips cost up to $5. The cost of implementing them in PCs would hardly be twice that.
- A standalone I-R port until recently cost almost as much as a cheap I-R controlled TV. Even now, you pay up to £80.

The mystery is, why are PCs not sold with I-R ports? Which begs another question: what are all those notebook and palmtop users supposed to be pointing their I-R ports at?

Compaq has actually dropped I-R support at the motherboard level on its new range. James Griffiths, senior commercial desktop product manager, said this was because of a lack of demand from corporates. "Margins on a PC are now so small, there is enormous pressure to shave every last penny off costs," he said.

Businesses that use I-R are likely to use network ports, so the focus on corporates ignores the needs of the individual user. Similarly pointless for the average user is the dedicated printer I-R port, as the same thing on a PC can both swap data with a notebook and print it out.

Clive Akass

Death of the floppy?

One new desktop that does sport infra-red is Apple's sensational new iMac. It may set the pace for the PC industry in another respect, too, by doing away with the floppy drive.

Full story, page 27

News edited by Clive Akass; news@pcw.co.uk ● Internet News edited by Susan Pederson; susan_pederson@vnu.co.uk

CD phone directory users risk prosecution, warns data registrar

Users of a new cut-price UK phone directory CD which lets you trace addresses of ex-directory users, could face prosecution, the Data Protection Registrar has warned.

The £20 I-CD even includes people who are not on the telephone. *PCW* used it to find the addresses of film stars, MPs and journalists. A £169 (ex VAT) Pro version allows reverse searches from a number or street. These are banned on BT listings.

The I-CD index is eccentric, but the speed and interface are a huge improvement on the old UK Info CD (*Newsprint, Dec 1996*). The data for that CD came from scanning printed directories; the new CD uses legal data sets employed by marketing and credit agencies. Sources include electoral rolls.

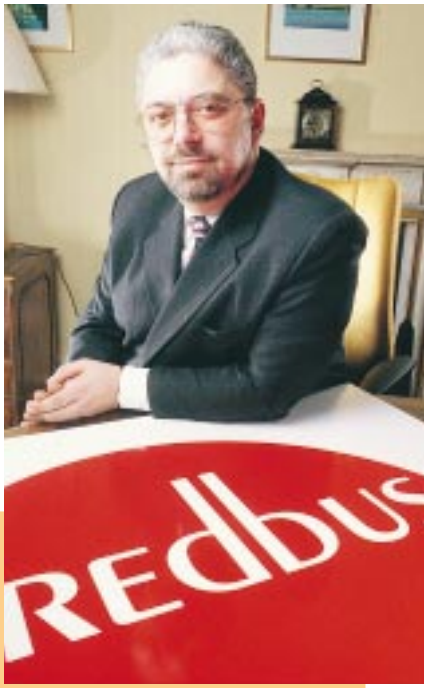
Sales director Alastair Crawford says all sources are legal and he dismisses privacy issues. "This kind of information has always been available if you knew where to go and could pay for it. All we have done is made it available to everyone. Similar listings are freely available in the US and on the continent." He says people have the option to get themselves removed from the listings. "There is a form on the disk for that purpose. But most people who contact us are pleased that they have been able to find long-lost friends and relatives."

DPR compliance officer Lorraine Godkin cast doubt on the accuracy of the listings but said her office could do nothing. She said people would not expect their address to be traceable from a phone number given out in a pub or classified ad.

She pointed out that the DPR had been against a law obliging electoral-roll data to be made available for sale.

And she warned: "The registrar would seriously consider any complaint against a third party that used this software inappropriately."

I-CD 01703 450450



Cliff offers £15m for your ideas

Web pioneer Cliff Stanford found himself with a spare £33m after selling Demon Internet last month, and promptly put up £15m to fund ideas or companies needing cash. Products will be "collaboratively marketed" under his new Redbus brand.

"I want solid proposals, with business plans. I don't want to hear about that idea you had in the bath last week," he said. "They need not be technological ideas. I don't want to go back to being a techie."

Stanford confessed to being sad on leaving Demon. "It's been a lot of fun," he said.

Redbus 0181 759 0005, www.redbus.demon.co.uk

Euro becomes font of more millennial woes

■ The new Euro has given PC users another running problem to go with the Millennium Bug and dialling changes, not to mention sunspot peaks and the Dow Jones blowout (*see p31*). Most PCs don't support the Euro symbol, and Windows 3.1 PCs will never do so, if their owners rely on Microsoft.

Windows 98 and NT 5.0 will support the symbol, and Microsoft will provide patches for Windows 95 and NT 4.0 — but only in Times New Roman, Courier New and Arial fonts. Windows 3.1 users have to wait for a third-party solution.

Mark Taylor, director of consulting at Microsoft, says: "It's vitally important that the symbol be supported. The Euro might be slow to get going but maybe even in a year, it will touch the majority of people's lives in the UK." He says the situation is like the Y2K problem, without the technical issues.

"He says it's endemic among IT workers worried about how they will earn a living when they run out of millennial crises"

Joe Graham, special projects manager for Fontworks, said: "All of the major font manufacturers are beginning to address this, but it's still in its infancy."

EuroType is selling a scalable TrueType Euro symbol, called Glyph, for use with other fonts. The single letter costs £49 (ex VAT). General manager Roger Beechey defends the price. "A lot of large financial companies can't wait until the font manufacturers do an update. A font bureau would charge you at least £80, so we're getting a lot of interest."

But Microsoft's Taylor said: "It should either be free or very cheap."

EuroType 01442 824130, www.eurotype.com
Microsoft 0345 002000, www.microsoft.com/msoffice/office/euro/euro1.asp

p26 ➢

Short stories

New Kyocera EcoSys

■ Kyocera has added to its cartridge-free range of EcoSys printers with the £520 (ex VAT) 8ppm FS-800 laser, designed for small work-groups and powered by a 50MHz PowerPC processor.
Kyocera 0118 931 1500, www.kyocera.co.uk

USB speakers

■ Labtec's LCS-1041 speaker system uses the USB digital interface to create pure sound — and it doesn't need a sound card. It is due to ship this autumn for £60.

Labtec 01252 629900, www.labtec.com

Virtual Access ships 'foolproof' routers

■ Virtual Access has launched a range of routers which it claims require no technical knowledge to install. The LinXSpeed Pro routers have a built-in web server, call up a service provider via a leased or ISDN connection, and configure themselves automatically.

Two analogue ports allow voice, phone and fax connections. Philip Smith, director of product marketing, said: "Each router effectively has its own engineer inside."
Virtual Access 01344 637000, www.virtualaccess.com.

■ ViewSonic claims its Super Clear technology gives its 17in GA771 monitor sharp focus and bright, vivid colours. With an 87Hz refresh rate and resolution of 1024 x 786, it has an estimated street price of £345.
ViewSonic 0800 833648, www.viewsonic.com

Compaq goes for PC power with ease of responsibility

Processor power is no longer a prime focus for PC buyers, particularly in big companies, according to top-selling vendor, Compaq.

Corporates are concerned with the ease and cost of maintenance, and with the issue of how long a PC will last before it needs to be upgraded.

"The take-up of Pentium II processors has been greater than we expected. But partly this is because people feel they have to buy high to be sure that the PC will be adequate for two or three years," said James Griffiths, senior product manager of commercial desktops.

He was launching the new Compaq range, which comes in two tiers.

The EP range replaces the entry-level DeskPro 2000 and middling 4000 ranges, using processors from the 266MHz Celeron right up to a 400MHz PII. The EN range adds management features, such as the ability to lock and unlock system boxes centrally.

The machines all boast ease-of-upkeep features, notably in making parts easily accessible. Disk drives can be turned to transform the box from a tower to a desktop configuration.

Griffiths said there were no plans to use Cyrix or AMD clones, rather than the cacheless Celeron, unless demand for them increases. "Celeron has about the performance of a 233MHz MMX, and using it gives us the advantage of having the same architecture across the range."

(The Intel chips all use Slot 1 boards, whereas the clones use Socket 7.)

Clive Akass

Compaq 0845 2704222, compaq.co.uk

● See Tim Bajarin, *News Analysis*, page 50

Deep Impact in class

The people behind the comet disaster movie Deep Impact are supplying GCSE science classrooms with a CD-ROM guide to comets and the universe. The guide, introduced by Patrick Moore, includes video interviews, animation and a virtual moonwalk. It also investigates the likelihood of the Earth being struck by a killer comet.

HP backs Windows terminals

■ Hewlett-Packard has launched a raft of new PCs and notebooks and announced their intention to be the largest vendor of PCs worldwide by the year 2000.

The mobiles range from recently announced handhelds through to new desktop replacement notebooks.

The new PCs are spread over four brands, covering everything from home computers, through low-end business PCs with Celeron, right through to Unix workstations.

Hewlett-Packard (HP) has also added NetPCs and WBTs (Windows Based Terminals) to the range, to cover every possible requirement of its corporate clients.

Nor is HP ruling out the possibility of producing NCs in the future, depending on how Java is developed. This is in contrast to Compaq (*see story above*), whose crown HP wants to steal, which reckons NetPCs still offer the lowest cost of ownership on a properly-managed network.

HP also introduced enhancements to its network management TopTools suite and some nifty security devices, notably a smart card which fits into the PC Card and then into a notebook.

If you lack a password, or try to use the notebook without the smart card, the system is disabled.

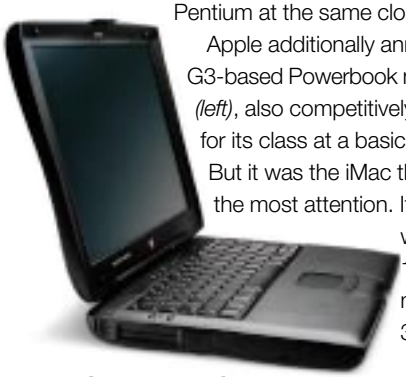
Adele Dyer

● Terminal affair — Comdex news, page 47

New models show some of the old Apple flair…

Apple was back in the limelight last month with the launch of its most novel design since the original Mac.

The iMac (*pictured, bottom left*) uses the latest PowerPC G3 chip and is priced in the US at $1,299 — a little over £800 and cheap enough to compete with low-end Windows PCs. UK prices and availability have yet to be announced. The G3 has a claimed performance twice that of a Pentium at the same clock rate.



Apple additionally announced a G3-based Powerbook notebook *(left)*, also competitively priced for its class at a basic £1,645.

But it was the iMac that got the most attention. It comes with a 15in 1024 x 768 monitor, a 33.6K modem, 10/100 Ethernet, twin USB ports and, in contrast to the latest PCs *(see page 24)*, a 4Mbit/sec infra-red port.

It also boasts 32Mb RAM, 2Mb SGRAM, a 4Gb hard drive and a 24X CD-ROM. Both the keyboard and mouse use the USB, again using technology PC vendors have been slow to adopt. What it does not have is a floppy drive *(see below)*.

The new Powerbook has an elegant black case, screen options up to 14.1in TFT, easy-access drive and battery bays, Ethernet, Cardbus and clock rates up to 292MHz.

It is luggable rather than portable, recognising that many notebooks are now sold as desktop replacements.

All the new Apples can run Windows apps using optional emulation software. Apple claims 292MHz G3 runs Windows as fast as a 233MMX Pentium. **Clive Akass**

Apple 0181 569 1199, www.apple.com

Let the good times roll again

TIM BAJARIN at the big Apple launch

■ I got a flash of *déjà vu* when Steve Jobs pulled the sheet off the iMac: it was like the unveiling of the first Mac.

Jobs walked out in a black suit, just like he did then, though he was not wearing the red bow tie he sported in 1984. And this time around he did not look like a kid. He is an industry veteran, even if he still retains his youthful enthusiasm.

With typical flair, Jobs showed off the next generation of mainstream Macs and I am convinced he has a winner.

The iMac may not win him new users, but it might help stem the drift of current ones to cheaper Wintel PCs.

Something more important is going on, though: the new, futuristic design is the first to break the rules of PC form factors. PC design has been in a rut. About six months ago, Jobs decided innovation was needed. This is risky, but hardly more so than the original Mac design, which led the world by introducing the 3.5in floppy. The iMac has no floppy, on the grounds that software is now distributed on CD-ROM.

Floppies are useful for backup and sneaker nets but they are not very efficient. More than one top PC vendor is thinking of dropping them, and the iMac may encourage them. It may also lead to some radically-designed PCs. Rock City Computers has already created a black, cube-like PC, aimed at under-35s who want to be different.

At the very least, Jobs is showing the PC world that it's OK to "Think different".

If only he could use this forward thinking to make Apple once again a serious player in mainstream computing.

Short stories

Quantum claims Shock breakthrough

■ Quantum claims a new Shock Protection System on its latest 3.5in Fireball EL hard drive range provides increased robustness and reliability.

Available in capacities between 2.5Gb and 10.2Gb, the drives have a 512Kb buffer and boast a 9.5 millisecond average seek time. Prices range from £146 to £321 (ex VAT).

Quantum www.quantum.com

■ Will we soon see an Oscar for best software package? It seems you can't make a blockbuster these days without a raft of 3D digital effects. Shepperton-based Magic Camera used 3D Studio MAX R2 from Kinetix to create the opening sequence of the film Lost in Space.

Kinetix 01483 303322, www.ktx.com

■ Mitsubishi has ramped up the speed of its M16C micro-controllers and announced two 100-pin additions to its 16-bit range. The M16C/62 and M16/61A will be used in GSM phones.

Mitsubishi 0990 134275

Touch screen

■ Interactive's £199 (ex VAT) Magic Touch Screen Pro simply plugs into your mouse port and hangs over your monitor.

Interactive Ideas 0181 805 1000

Data catcher

■ ComputerBoards' PCI-DAS 1200 data acquisition board incorporates 16 single-ended or eight differential analogue inputs as well as two analogue outputs, each offering 12-bit resolution and 24 bits of digital I/O.

Adept Scientific 01462 480055

p29 ➢

Paper tigers aim to turn your hard disk into a filing cabinet

Esselte and Xerox are both trying to resurrect the idea of the paperless office with two products that promise to make light work of managing scanned-in documents.

Xerox ScanSoft's latest Pagis Pro 2.0 bundles three products: TextBridge Pro 98 professional OCR, for translating scanned documents to text, MGI's Photosuite for photo editing, and Pagis Copier for making colour photocopies. This is in addition to document management software. The new version costs £99 (inc VAT) and uses the Windows Explorer filing system.

While Xerox focuses on scanning capabilities, Esselte gears its Paperlite Live more for document management.

It uses a filing cabinet metaphor to store a variety of documents. It will cope with files from applications like Word or Excel, as well as scanned-in files or even email and faxes.

You can save filing cabinets on a CD-ROM or Zip cartridge for distribution. Paperlite Live comes with a C200 flatbed scanner and optional document feeder, and a D100 electronic notepad and pen for £89.

Susan Pederson

ScanSoft 0118 981 4230, www.pagis.com. Esselte 01954 789037, www.esselte.com

AMD predicts home-networking boom with rise of two-PC family

■ Smart appliances and the rise of the two-PC family are leading to a new class of product for home networking. Latest to get on the bandwagon is AMD. Its networking-chip business is bigger than its higher-profile processor cloning.

The company has licensed Tut's HomeRun technology which uses existing home-phone cabling for Ethernet links between PCs. An added advantage is that users can extend networks using familiar telephone flex rather than messing with trickier 10Base2/T connections.

The system allows voice calls, net traffic and high-bandwidth xDSL internet signals to use the line simultaneously, by using three separate frequency bands.

Dave Brand, director of European marketing for AMD's communication and components group, reckons there are 4.55 million two-PC homes in Western Europe now and that there will be 16.7 million by 2002. Inteco, the market analysts, reckon corresponding UK figures are 900,000 now, rising to 2.7 million by 2002.

AMD will marry its own Ethernet silicon to the Tut modulation system on a special Network Interface Card (NIC). "The system will have to be cheap (less than $100) to encourage people to buy it," said Brand.

One snag of the system is that it will work initially only at 1Mbit/sec. But Brand says AMD will quickly push this up to standard Ethernet's basic 10Mbit/sec. First products will be available later in 1998.

They will face opposition from standard network vendors selling NICs starting at £17.

AMD 01276 803100, www.amd.com

UPS and power downs

You can protect your PCs from power problems with the Line UPS uninterruptible power system range from Advance-Galatrek. The devices cope with sags, brownouts, surges, spikes, electrical noise and blackouts, all starting from £135 (ex VAT).

Advance-Galatrek 0800 269394, www.ael.u-net.com

Short stories

Microsoft buys Lotus eater

■ Microsoft has bought a company specialising in software that helps Lotus Notes users migrate to Microsoft Exchange.

Products from The Mesa Group enable Exchange and Notes to coexist, with integrated messaging and functions. Its flagship Application Assessment and Planning provides an audit of Notes databases and applications and recommends whether, and if so how, each should be moved to Exchange. The products will be free to Exchange 5.5 users from next month. *VNU Newswire*

LCD prices fall - a little

■ CTX is hoping to drive down TFT display prices with the launch of its LCD Panoview 745. The 14.5in flatscreen is analogue, which means it can be used from a standard VGA port with no special cards or drivers. The Panoview costs £999 (inc VAT)… still four times the price of a standard monitor.

CTX 01923 810810, www.ctxeurope.com

Power 98

■ Yet-to-be-launched Windows 98 already has an add-on. PowerDesk 98 (£29.95), from Mijenix, has improved file-management, file viewers and zip/unzip facilities.

Atlantic Coast 01297 552222; evaluation copy www.atlantic.coast.com/cgi-bin/sellonline/r4002.htm

■ Sun's latest 360MHz 64-bit Ultra-SPARC-II processor is being used in its new Ultra 60 workstations. It sustains 1920Mbps bandwidth to main memory, a claimed three times the speed of many competitors.

Sun 01252 399570, www.sun.com

USB camera

■ Pace is selling a USB PC video-camera. £199 (inc VAT).

Pace 0990 561001

p31 ➢

Shiver my sporran! Scots buy up uncensored newsgroups

Demon Internet's hands-off policy on sexy content on its servers will continue despite its £66m buyout by Scottish Telecom, the flagship phone provider of traditionally prudish Scotland.

Demon, which pioneered internet provision in the UK with a £10-a-month flat-rate charge, is the only provider to carry uncensored newsgroups. According to the new owner, many of its subscribers were concerned that this policy would be changed. "We have no plans to do so," said Scottish Telecom's Alex Barr.

Roy Bliss, MD of Demon, said: "It is folly to remove a whole subject area, because it's not eradicating the problem at source.

"Scottish Telecom is aware of our stance on the issue. We provide a full news feed. But we abhor and remove any illegal content, and would discuss it in full with the authorities or the Internet Watch Foundation."

A BT spokesperson said: "We don't carry any newsgroup that is illegal or offensive. We have a dedicated team that monitors the newsgroups, and if there's a whole subject area that is offensive, we will shut it down." **Susan Pederson**

Y2K bugged? Just wait till the sun storms strike...

Y2K round-up

■ As if the Y2K were not enough to worry about...

● Scientists warn that sunspots, which are tornados on the Sun's surface, will reach a 10-year peak in 2000. They throw off radiation which could severely hit communications satellites.

● And there are fears that the Dow Jones Industrial Average will creep too high. Analysts Gartner Group warn that if the US blue-chip index tops 10,000 (it's currently at about 9,200), many software packages will be unable to cope. Most software used by financial organisations to track Dow Jones can only handle four-digit figures.

● The Y2K Bug has already hit hospitals. Some operations scheduled for after 1st January 2000 have been cancelled by confused computers.

At least one procedure was cancelled after a computer disregarded supplies with a 2000 expiry date. Nearly one in three NHS facilities have spent nothing on the problem.

Ciriz says it can help solve the problem with portfolio assessment, impact analysis and renovation tools. Ciriz 01491 843 700, www.ciriz.com

● Most small and medium companies in Britain know of the Y2K bug and are beginning to take action, says a survey by Action 2000. Thirteen percent have taken no action, and more than eight in ten of those say they do not intend to do so. Action 2000, 0845 601 2000, www.open.gov.uk/bug2000.html

● Fewer than one in three UK corporate PCs are Y2K-compliant, says PC management company fPrint. But it says that the problem isn't as bad as it sounds, as many PCs are due to be upgraded. **Susan Pederson**

More dial changes

Phone watchdog Oftel has warned of a new millennium problem which will affect PC users.

Dial-up scripts and other software using phone numbers will need changing to cope with a new numbering system which comes into effect three months into the new century, on 22 April, 2000.

UK numbers will fall into nine families beginning with the figures 01 to 09. The first three designate area codes, 04 to 06, are reserved for future use; 07 is for mobile, paging and find-me-anywhere numbers; 08 will be for special services such as schools internet, and 09 will be for premium rates. London numbers, for instance, will be prefixed 020 followed by eight digits.

Peter Clark, of the National Code and Number Change steering group, said changes are needed because of "an unprecedented increase in telecoms use." Details at www.numberchange.org.

Short stories

■ Speed up your data gathering with the Panasonic S10 mobile data terminal. The 486-powered pen-based device has a card slot, serial and infra-red ports, 4Mb flash ROM and 2Mb RAM which can be expanded, and a RRP of £799 (ex VAT). Panasonic 0500 404041, www.panasonic.co.uk

64Mbyte RAM chip

■ Samsung claims to be the first to get 256Mbit (64Mbyte) DRAM chips into the factories. It has sent major IT vendors samples and will begin mass production next year. *VNU Newswire*

■ Lexmark's £179 5000 Jetprinter offers 1200 x 600dpi resolution and a wide head, printing up to two lines at once. You can upgrade from 4-colour to 6-colour printing. Lexmark 01628 481500, www.lexmark.co.uk

■ You can create a personalised CD filing system with the £15 Print & File CD Envelope Kit from Neato. Neato 0990 561571

p35 ➢

Telework backlash

A serious backlash against teleworking is forecast by a leading analyst.

Gartner Group research director John Girard said companies worldwide have failed to realise that teleworking will increase IT budgets and organisational problems. It will become more common but needs to be implemented with care, he told a conference.

"Organisations must… modify their business processes and IT budgets to compensate for new work paradigms," he said. Home working swells IT budgets by up to 157 percent in phone bills, equipment and technical support, Gartner estimates.

But there are big rewards to be gained in improved productivity, non- IT savings, environmental benefits and "having the right employees in the right place". Gartner believes that by 2003, some 137 million employees will be working offsite worldwide.

Caroline Gabriel

Mouse scores!

The Sportsmouse from Logic 3 will guarantee that no-one takes you seriously at work again. But if you've already given up your dreams of corporate domination, the two-button rodent costs £20 (with mat) from most computer shops. Spectravideo 0181 902 2211

Short stories

New Paint Shop Pro

■ The latest version 5.0 of Paint Shop Pro has been launched by Jasc Software. New features include support for multiple layers and over 40 graphic file formats, new touching and imaging tools, and multiple-level undos.

It costs £69.95 (£29.95 upgrades) and a demo can be downloaded from www.digitalworkshop.co.uk. Digital Workshop 01295 258335

32-bit PKUNZIP

■ The 32-bit DOS version of PKZIP is now available from Atlantic Coast. Compatible with Windows NT and 95, PKZIP 2.2 supports long filenames, batch operations, and spanned ZIP and EXE files. PKZIP is available for £19.95 (inc VAT). Atlantic Coast 01297 552222, www.soft-shop.com

NetChannel's new cable link to a TV revolution

Caroline Swift continues her reports from Silicon Fen

NetChannel's $1m acquisition by NTL, the UK's third biggest cable company, may not have caught everybody's eye. I have been following it with interest, as the company is further down the enhanced TV road than many of the big players.

NetChannel was set up initially by Cambridge entrepreneur Hermann Hauser as the marketing arm of Net Products, to launch network computers based on Oracle reference designs drawn up by Acorn. It became the UK subsidiary of US firm NetChannel in November '96.

The sale enables NetChannel to expand with NTL to deliver an affordable, innovative service. A two-month pilot at 100 homes in London and Brighton showed that whatever people wanted, it had to be made really simple.

"The challenge we have is that there is high awareness of the internet but, for a lot of people, the word 'internet' can trigger a fear of technology. It is a significant positional challenge," said managing director Peter Boreland, who has built up a team of 25.

By October's national launch of the £299 NetChannel set-top box (delivering the net to homes without the need for a PC), the company had 30-plus content channels, national distribution through Dixons and some 300 outlets.

This year, NetChannel set out with partners to explore new channels such as digital TV and cable.

"NTL's real value is that they pass into two million households and have a powerful sales force," said Boreland. "They can sell NetChannel and can demonstrate the service."

NetChannel was the first company to offer European TV viewers net, email and interactive services via a standard TV. The concept is new to most viewers, but NetChannel believes Microsoft's WebTV, for which a UK trial has been announced, will raise awareness.

NetChannel is much more than a browser. It provides six content channels featuring shopping, entertainment, lifestyle, sport, learning, information, classifieds and news. Pilots showed the service has particular appeal to women, said Boreland. "If they have kids, they can see the benefit. It can be used in the living room and now there is a lot more in terms of content, there is much more interest.

"The big challenge is communication. People have to be educated on the social value and real benefit."

Boreland believes NetChannel's nine-months operating experience gives it a head start over companies such as Cable and Wireless which will have to go through the same learning process. NTL Internet Group managing director Blake Barker sees TV delivery of internet programming as a potentially huge market: "The forecast for the next five years is that 2.5 million households will be accessing the web through TV."

"Essentially it is a new form of TV," said Boreland. "Internet and TV are going to be brought together, creating better TV and better value in an interactive viewing experience. We can deliver, today, a personalised localised service. It is a new social medium."

● I must mention Silicon Fen's big success story: the 25 times over-subscribed flotation of ARM Holdings, a.k.a. Advanced Risc Machines, which values it at £380m.

Sony Semiconductors has licensed the ARM740T-cached core for its new digital devices. More on that next month.

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Internet shorts

The reel thing
Find out what's showing at the local rep with a new service from Virgin Net. At www.virgin.net film buffs can consult listings of more than 700 cinemas and art centres across the country. They can also get the latest news and reviews, enter competitions and chat with other moviegoers.

Glued to the box
A survey commissioned by Barclays PC Banking found that more than a third of people who use a computer at work or at home spend more time in front of their PC than their television.

Net access deal
Domain name registrar NetBenefit is offering I-Dial, a net access service for small and medium firms. It includes a high-speed connection via 56K modem or ISDN as well as unlimited email addresses, web space and 24-hour technical support for £180 (ex VAT) pa. www.netbenefit.co.uk

Showtime for BT's high-speed lines

The final obstacle to British Telecom's (BT) provision of high-speed services to homes has been removed following the lifting of a ban on it providing entertainment services. The ban was imposed to encourage cable companies to set up shop as a rival to BT. But BT had long argued that it needed revenue from entertainment providers to recoup the billions of investment required by high-speed services.

Margaret Beckett, President of the Board of Trade, announced that public telecom operators, along with all others, should have the option to compete in providing broadcast entertainment and services after 1st January, 2001. She said the ban had become "increasingly damaging for all operators, including cable". She hoped the move would restore confidence in all market players and encourage competition to drive down prices for consumers.

But Aileen Boughen, spokesperson for BT, said BT did not plan to make programs in the general sense but wanted the opportunity to offer channels to other providers. She said, "Obviously there are lots of applications for these networks and we want the widest possible access to them."

Ms Boughen would not say whether the change would speed up the introduction of high-speed technologies like ADSL, currently going through yet another BT pilot.

"I don't want to comment specifically on what we will do and when," she said. "What we most welcome about this announcement is that it does give us certainty. It allows us to be more sure about time scales for rolling these things out."

Cable and Wireless stated it had been expecting the deal. "Our plans are completely unchanged," said a spokesperson. "Everything will go on exactly as planned."

Another side of the tracks

The National Railway Museum is featuring its photographic exhibition, Worth a Thousand Words, at www.nmsi.ac.uk/nrm. This 1953 photo shows two rat catchers at St Pancras Goods Yard with their dogs Jill, Sally and Tiny. Visitors to the museum will also get the chance to have their own images displayed on the internet.

Question time, blurred

■ The Labour and Conservative Party leaders' attempts to boost their anorak street cred have been greeted with bemusement. Tony Blair gave a live internet interview, while AOL users were simultaneously treated to "A Day in the Life of William Hague". Lib Dem leader Paddy Ashdown was unimpressed, pointing out that he has been answering questions by email for ten years now. The first question asked of Blair was whether he could score a couple of World Cup tickets, while the highlight of William Hague's day online appeared to be an award luncheon celebrating top tie-wearers. Democracy in action, indeed.

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Barclays Bank criticised over its online service charges

An e-commerce analyst has chastised Barclays Bank for charging for online services which actually save the bank money.

Jonathan Steele of the Bathwick Group says the charges are hurting both the banks and its customers. He pointed to American Banking Association (ABA) figures that put a branch transaction at approximately 12 cents, while an online transaction only costs a penny. "Security is not a huge concern for consumers any more," he said. "But there has to be a compelling case for online banking before they will adopt it. You can't charge for it."

A spokesperson for Barclays said the ABA figures are misleading. "The straight transaction cost doesn't tell the whole story," she said. "They haven't taken development or research into account." She defended the charges, saying that, while a customer might go into a branch only once a month, they are much more active online. She said the increased volume of transactions and the cost of providing technical support were the chief reasons for the charges, but still thinks that customers are getting a good deal.

"The incentive is convenience. Our research shows that they think £15 per year is good value and they're very happy with the service they're getting," she said.

Barclays has signed up 42,500 customers to its PC Banking Service and is attracting a further 5,000 customers a month. Charges are not enormous: an initial £30 plus £15 a year after the first year, and an extra £30 if you want to use Microsoft's Money 98 software.

Microsoft has announced partnerships with three other major UK institutions for customers to use Money 98 to manage their bank accounts over the net. They are Nationwide Building Society and the Royal Bank of Scotland. NatWest Bank will go live online with Money 98 later this year.

Worldwide wallet

Barclays electronic money scheme is ready for business from all corners of the globe. BarclayCoin <www.barclaycoin.co.uk> has been extended to include cards from other issuers.

It enables users to download an "electronic wallet" which is then linked to their bank account. The wallet can be used for online purchases, including micropayments.

Susan Pederson

Flower power

Teleflorist is extending its online presence following the success of its Mother's Day campaign, which saw ten percent of its orders placed via the internet. The flower delivery service <www.teleflorist.co.uk>, which will be advertising on Ukplus <www.ukplus.co.uk>, plans to target men "who feel embarrassed trying to find the right words in a florist's shop".

Susan Pederson

Firms get leg-up onto net

Businesses that need help getting online should check out WebStart from the Montal Group.

Montal offers a consultancy, design and web hosting service for companies operating on a limited budget.

After the initial briefing to help define the business's web site objectives and content, Montal will design the site and register the domain name.

Montal sets up a test web site and, once that is approved, will provide a dialup account, unlimited email and internet access for £1,525 per annum.

Businesses can choose the option to manage the site themselves.

Montal 01306 888000, www.montal.co.uk

Call to clarify net trading

The European Union (EU) is urging World Trade Organisation (WTO) members to discuss an agreement against imposing border tariffs and to establish some basic e-commerce principles. Brussels says that WTO rules on e-commerce should be clarified, and perhaps revised, by December this year.

The US tabled a proposal last February that seeks to outlaw border tariffs on internet transactions.

p40 ➢

Chips down on spam

The Direct Marketing Association (DMA) has attacked a UK consumer watchdog's stance on junk email. This follows in the wake of a report that the problem is costing British and Irish businesses £5bn per annum in wasted time.

The independent report, commissioned by Novell, found that 75 percent of those surveyed spend nearly 15 minutes dealing with up to five spam emails each day.

Calling bulk email "an absolute scourge of the internet industry," Alan Stevens, editor of Which? Online, commented that it had to be tackled at the source. "ISPs have to terminate spammers' accounts," he said. "You've got to make life as difficult as possible for these people."

But Martin Bartle, spokesperson for the DMA, disagreed with the comment, saying, "I find that incredibly naïve. If you kick me off an ISP, I can be set up on another one in an hour." He believes consumers will have to take action as well.

"There are people who register on a site with their personal details and then they are shocked and surprised about what they receive," he said. "You have to be sophisticated about it." Bartle called for reputable direct mailers to "reclaim the high ground", saying the problem could be solved by self-regulation and email filters.

Stevens thinks the DMA's proposed email preference service is not sufficient to deal with unscrupulous mailers, either. "These kind of people will just ignore it," he said. "I use filtering as much as possible, but the most effective way is to stop it at source."

He believes you shouldn't discount the psychological cost of junk email, either. "You can throw a fax in the bin but you're almost forced to read email, and some of the content is very offensive."

Susan Pederson

Soccer to me

Get the latest football news and views delivered direct to your desktop for free by registering at www.football365.co.uk. Not only this, but you can wind up your mates by sending them a Toon-e-gram: an animated email postcard featuring your choice of a useless goalkeeper, an on-pitch argument or a juggling player, complete with a congratulatory (or abusive) personal message.

Internet shorts

Heard the good pews?

A satirical Christian magazine has been relaunched online to counteract "the dull conservatism of most Christian periodicals". Ship of Fools features Gadgets for God and the Mystery Worshipper, who anonymously vets churches according to the length of the sermon, the friendliness of the parishioners and the comfort of the pews.
http: //ship-of-fools.com

BT catalogue online

BT's latest ISDN products can be found at www.isdn.bt.com. Featuring its catalogue of ISDN products and services, this is where users can get independent advice. ISDN 2e can now be ordered directly from your PC, or you can check out details and promotions of selected third-party products.

Here is the Euronews

The latest European news, sport and weather is on ITN's European web site, available in English, French, German, Italian or Spanish.

Euronews will also feature magazine programming on the arts, politics and the economy, and a guide to the key online sites in Europe.
www.euronews.net

UK Top Ten web sites

Any carpenter will tell you that architects should spend a year as a builder's apprentice before they draw a single line. Some web designers could do with a similar reality check. The Pure Design site asks you to resize your browser and change your font, monitor and colour settings. Why not leave them to it and check out Virtual Carnaby Street instead? Just be sure to tip your hat as you pass The White Horse, a favourite haunt of the notoriously down-to-earth *PCW* staff.

1. Arts Alliance	www.artsalliance.co.uk
2. BBC Bites Size Revision	http://db.bbc.co.uk/education-bitesize/pkg_main.p_home
3. Brighton & Hove Virtual Festival	www.virtualfestival.org.uk
4. CCTV	www.spy.org.uk
5. Press Association News Centre	www.pa.press.net
6. Pure Design	www.puredesign.co.uk
7. Quixell	www.quixell.co.uk
8. Threshers Wine Shop	http://thresher.lineone.net/thresher/index.icl
9. Virgin Trains	www.virgintrains.co.uk
10. Virtual Carnaby Street	www.globaledge.co.uk/carnaby

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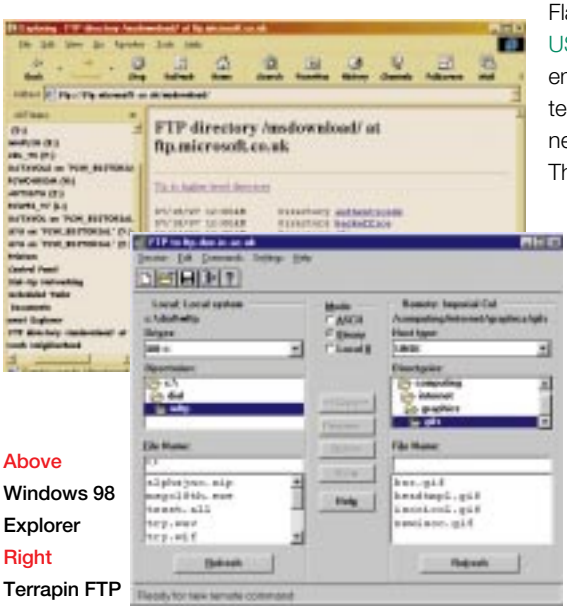
Transfer interrupted

Interrupted downloads must be costing us all millions. Clive Akass rises from his sickbed to find out why the web can't cope with this most basic problem.

First, a health warning: *if, like me, you have been ignoring advice about how to sit at a computer — don't*. I have spent much of the past month nursing a cricked back, caused by too many hours crouched over a hot keyboard, and it has not been pleasant. I've now got ErgoSentry reminding me to get up and stretch at sensible intervals, and suggesting exercises. I am now trying to remember to sit properly.

My days away from the office gave me a chance to play with software and peripherals I don't usually have the time for. The first thing I did was to upgrade my Sportster Flash modem from US Robotics' pre-emptive X2 56K technology to the new V.90 standard. There seemed an immediate improvement in performance, though whether because of a better standard or a clearer line to Pipex, I do not know.



Above Windows 98 Explorer
Right Terrapin FTP

It still took me all evening to download a 10.3Mb demo of the MiniTab statistical package <www.minitab.com>. My first try hung with 98 percent downloaded and I had to start all over again. My second try hung after 60 percent and I was third time lucky. It happened that a reader emailed *PCW*, shortly before my back gave out, to ask if there was any way around this kind of aggravation.

This is my take on the issue, and I'd be happy to hear from anyone who can fill in the gaps: File Transfer Protocol (FTP), the original internet protocol, can resume downloads from a break point, thanks to a recent extension. The most recent version 1.1 of HTTP, the driving protocol of your web browser, cannot — or, not so far as I can make out from the specifications. About 90 percent of downloads are performed under http, although according to Alaric Woodhouse of FTP specialist Terrapin, FTP is quicker and more resilient. (I should explain here that your browser can perform an ftp data transfer under http and has probably done so, even if you were not aware of it, but the transfer may be slowed by the double layer of protocols. To get the full benefit you need a dedicated ftp client.)

Relatively few sites offer an ftp option, and a significant proportion of these do not support the Resume feature, including all those running Microsoft's Internet Information Server (IIS). This is astonishing, when you think about it. You could hardly get a more basic net activity than a file transfer, nor a more basic problem than an interrupted transmission, yet mostly the net cannot cope with it.

Steve Harris, who presides over the technology behind our VNU site, reckons the reason that net designers were so careless about transmission breaks was that they developed the protocols on fixed-line systems where the problem is less important. "The non-net protocols were just the same. I think only Z-modem allowed you to resume."

Something similar may have happened when IIS was developed. A Resume facility would not be a priority for Microsoft's prime corporate clients because transmission breaks are a negligible overhead on fixed-cost intranets or leased lines. But the rest of us collectively must be paying millions in phone charges for interrupted downloads.

Microsoft's UK net server product manager, Peter Bird, was disarmingly frank about IIS 4.0's failure to support ftp Resume. "To be honest, I can't give you a good reason, except to say that the overwhelming majority of files are downloaded using http. The Resume is not a mandatory feature of ftp, but it will be supported in IIS 5.0. I can't say at this stage when that will be available."

Doubtless one reason for ftp's unpopularity is the fact that older clients tended to throw up lengthy Unix file listings that were hardly comprehensible to PC users. The latest versions are far friendlier, offering Windows-style directory trees. In fact, the Windows 98 Explorer is itself an ftp client, allowing you to drag and drop files from an ftp server as if they were on your own hard disk. It is very basic, with no Resume feature, but it could make ftp more popular. It may also get people interested in the likes of Terrapin FTP, the latest version 2.11 of which is said to allow you to break off a long transfer yourself, and resume it a week later.

So next time you want to download a long file, try using an ftp client instead of your browser. As Microsoft's Bird said: "The more people who use or ask for these facilities, the more they will get implemented." ■

ErgoSentry
www.magnitude.com

USR upgrade
www.3Com.com

Evaluation copy of Terrapin FTP
www.terrapin.com

Terminal business

Following their high profile at Comdex, Dominic Deckmyn believes Microsoft's endorsement of Windows-Based Terminals is both a promise and a threat.

Comdex Spring was thin on new products, but prominent among those that were there were Windows-Based Terminals (WBT), the Microsoft-friendly alternative to the classic Network Computer (NC). Whereas the NC downloads its applications and data from a server, the WBT runs a Windows application on a server from a local screen.

Wyse, NCD, Boundless and Tektronix all demonstrated similar-looking devices at between $600 and $900. All were using the multi-user version of NT codenamed Hydra, which is expected to ship as Windows Terminal Server in June. It is based on MultiWin technology that Microsoft purchased from Citrix last year for $75m plus up to $100m in royalties.

WTS uses either Microsoft's own RDP protocol or Citrix' tried and tested ICA, which requires the purchase of an add-on called Metaframe but can turn non-Intel devices such as Macs, Unix boxes, and Java-based NCs into Windows terminals.

RDP will only run on top of systems with 16-bit Windows, Windows 95, NT or CE. Most vendors at Comdex Spring agreed that in its current incarnation, RDP is slower and more limited in functionality than ICA.

All WBT vendors demonstrated devices running Windows CE connecting to Hydra using RDP, ICA or both. Tektronix is already shipping devices that run a proprietary operating system and ICA, but which can be upgraded to Windows CE with RDP. Prices start at $745 without a monitor.

Boundless demonstrated Viewpoint 400, running RDP on Windows CE, and the Viewpoint 300 running ICA on Windows CE. Cruise Technologies presented a pen-controlled portable wireless WBT, codenamed Wilke, which will be built by Wyse.

The Wyse Winterm 2600SE is a Windows-Based Terminal — one of many such devices on show at Comdex

Analysts predict that WTS will lead to a surge in Windows terminal sales; some say they will outsell Java-based NCs within a couple of years. Zona Research estimates that thin clients based on Citrix ICA, the direct precursors of the WBT, last year outsold Java NCs by almost three to one.

Metaframe is Citrix' most important launch since its Winframe product, which first allowed multiple non-Windows systems to access Windows applications remotely. Having had the market to itself, Citrix now faces competition from Microsoft, which means it must persuade users to buy Metaframe in addition to Microsoft's Windows Terminal Server. However, Microsoft's endorsement of the technology will undoubtedly expand Citrix' market. And Citrix appears to be on a roll, with major vendors selling devices using its software. Last month, it announced record revenues of $49.3m (up 129 percent from last year) and net income excluding one-time charges of $16m (up from $7.5m).

Because of licensing issues, the current Winframe is still based on Windows NT 3.51 and its outdated interface. Metaframe will provide the long-awaited upgrade to Windows NT 4.0, and to the Windows 95 user interface.

But there's a catch. Metaframe runs on top of Microsoft's Windows Terminal Server: the result of protracted negotiations between Microsoft and Citrix last year as they reworked their long-standing licensing deal.

Citrix appears undaunted by the competition. Senior product manager James Marsala claims WTS is to Metaframe what the Windows Notepad is to a proper word processor such as Word. "If you're thinking about enterprise applications, you need ICA," he said.

The new version of ICA will allow sound, which RDP does not currently support. And, when running on a Windows PC, local Windows applications and remote applications will look and work in exactly the same way, and remote applications will be able to use local printers.

On the server side, Metaframe offers load balancing (the ability to spread the user-load evenly over a cluster of servers), powerful management tools and the ability to "publish" an application to a group of users at one time. Finally, ICA also works over the net. All these features might swing enterprise customers towards Citrix.

Last month, IDC predicted that the WBT market will balloon from worldwide unit shipments of 302,000 in 1998 to five million by 2002, out of a total thin client market of 6.8 million. That's a much bigger pie. Even with a modest piece of it, Citrix could flourish.

● *See also our Network Computers feature, p116*

Coming very soon... the PC that can see what you mean

From Dominic Deckmyn in Chicago

■ Microsoft chairman Bill Gates used his Comdex keynote speech to sketch the future of Windows and the applications it runs.

Almost all documents will eventually be formatted using web-standard HTML and its more versatile sibling, XML, he said. This convergence of net and native PC formats is reflected in Windows 98, which uses the same web interface for browsing local files, the web itself, and Help files.

Cryptic error messages will become a thing of the past, Gates pledged. Errors will be passed to diagnostic and help systems to identify the problem and advise on how to solve it, and the difference between file and directory names and net addresses will disappear. Gates said this technology will ship first in an NT-based Windows 98 successor, due some time after NT 5.0's launch.

Gates outlined key components of Windows development:

- Further unification of the user interface.
- Within three years PCs will get "vision", recognising and responding to human gestures "seen" by a video camera.
- Speech recognition and natural language processing, allowing you to communicate with PCs much as you do with humans.
- Handwriting recognition.
- Automatic learning. The PC will learn from the tasks you perform and become better with experience.

Gates gave only a brief demo of Win98, connecting a scanner to highlight the new operating system's support for the USB. This caused the PC to crash. "That must be why we're not shipping Windows 98 yet," he quipped.

Smart badges 'can oust passwords'

Smart badges that tell your PC all about your comings and goings can do away with the need for password-protection, the designer claims.

A transceiver plugged into the PC's serial port senses when your are at your desk, wearing your badge. The keyboard seizes and the screen goes blank when you move away. The PC resumes normal operation when you return.

Developer RF Ideas claims the badge is safer than password protection and can save on support costs, as users have one less password to forget. And, unlike smart cards or fingerprint recognition, the badge works without user interaction. (You can still access your PC using a password if you forget the badge.)

AIR ID 1.0 costs $295 in the US. But it will not ship to Europe until later this year, after localisation is complete.

www.rfideas.com

Firm waxes enthusiastic over hi-tech signet ring

■ A Texas company, Dallas Semiconductor, has brought back the signet ring as a way of user identification. The ring carries a "Crypto iButton", with nearly a million transistors implementing the Java Virtual Machine. It packs an 8-bit processor, 6Kb of SRAM, and 32Kb of ROM storing a unique 64-bit registration number that can be read by any application communicating with the iButton. A tamper trigger zeroes this number if anyone tries to open the ring. The designer claims that users can sign electronic documents and generate certificates to access restricted web sites without ever revealing their private keys.

www.iButton.com.

Comdex shorts

USB net link for notebook users

■ Notebook users will be able to use a USB port to connect to an office network, thanks to a controller developed by Kawasaki LSI. The KCUSB16 is designed to be fitted into a cable-end module, and should offer cheaper and faster connections than PCMCIA equivalents, the company says.

"This chip is the first of its kind that enables the cable itself to become the ethernet adapter," said Frank Corbett, vice president of sales.

The KCUSB16 will be available in quantity later this year. A cable adaptor using it is being developed by Peracom <www.peracom.com>.

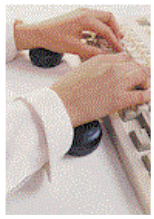
More details at www.klsi.com

Windows 98 add-on

■ Windows 98 has yet to ship, but Play Inc, based in California, has already launched an add-on for it. Gizmos 98, priced at $49.95, is a collection of utilities including a flashy set of calculators and clocks.

It also offers a presentation tool orientated towards the home user. Business utilities include file encryption and a permanent file remover.

Play.com



■ A pair of sliding wrist pads that move with you as you type can help prevent repetitive strain injury (RSI), says Ingenious Solutions.

The WristGliders sell in the US for $16.95 for a pack of two. Full details are at www.wristgliders.com.

Mouse-pad organiser

■ A mouse-pad organiser from Questech includes an 80-second memo recorder, a clock, a flashing reminder light and a calculator. The Memo-Mouse, powered by battery and solar cell, will cost about $40.

www.questech-international.com

Aura floorer

■ Inneractive showed a bio-feedback imaging system called Aura Video Station which, it claims, helps educate people about their "energetic wellbeing".

www.inneractive.com

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New card sticks a hard wall between you and the hacker

An add-on card that provides a hardware wall between your PC and the outside world has been packaged for Windows users.

Calluna Technology demonstrated the Hardwall card some months ago. Now Vircon, a division of the company, is selling it with a complete set of Windows 3.1, 95 and NT drivers for £185 (ex VAT), complete with Norton Anti-Virus and PartitionMagic Lite software.

The latter allows you to set up partitions on your disk with different security ratings. One might be completely hidden, another might be read-only. The root directory is what Vircon calls Write Many Recoverable: it always returns to the same state when you boot up.

This means you can recover your PC if the system files and other root information are corrupted by a virus or other mishap.

It is also, says Vircon director Peter Barlow, good for trying out new software which may disrupt a working configuration.

An internet user might use Hardwall to block off access to all but the root and a special net directory.

Barlow claims the Hardwall is unhackable because all processing is done on the card itself.

Vircon 01592 631245, www.vircon.co.uk

Reflex action over 'hype'

■ Reflex has declared war on what it calls "misleading hype" from some virus-scanner vendors who give users a false sense of security. It claims its all-new 32-bit Disknet Data Security Suite offers protection from both external and internal threats, guarding against disgruntled employees as well as hackers and viruses.

The NT version lets you automatically encrypt a hard disk of up to 4Gb. But Reflex still advises customers to add at least one third-party virus scanner for maximum protection.

The software checks each program on a disk to see if it has been authorised. If not, it will bar you from opening or installing it until an Administrator module has scanned it for nasty bugs.

The Administrator uses Sherlock, a fast 32-bit virus scanner, and Interceptor, a macro-virus scanner.

If authorised for use, a disk is stamped with a unique signature which allows it to be used throughout the organisation.

Disknet starts at around £100 per seat for a five-user licence.

Reflex 0171 372 6666, www.reflex-magnetics.co.uk

Right: **Reflex marketing director Philip Benge takes a match to rivals**

First Access macro virus 'is benign'

Sophos claims to have found the first macro virus to affect Microsoft Access database files. The Access-Jerk1N virus (a.k.a. AM9/Accessive) is benign, like the original Concept macro virus which infected Word. It is unlikely to spread anything like as fast as Concept because database files are not exchanged so commonly as documents.

Sophos 01235 559933

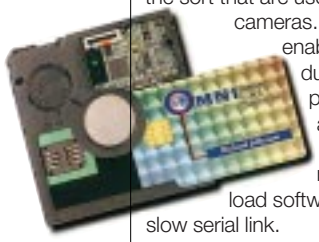
Security shorts

Floppy drive smart card reader

■ A device that allows a standard floppy drive to read a smart card is to be launched by SmartDisk Corporation, a new joint venture between Fischer International and Toshiba.

The card slots into what looks like a standard floppy, which carries all the mechanics and logic (*see picture, below*) to read the information. SmartDisk believes the device will initially be popular for home-banking schemes, but it could also be used for network security and other smart-card applications.

SmartDisk plans a similar device to read memory cards of the sort that are used in digital cameras. This will enable users to dump their pictures to any convenient PC with no need to load software or use a slow serial link.



Fischer International 01923 859119

■ Old-fashioned security measures can be as good as any. The Lokblok Futura, one of a range of locking devices from Safemark, encloses your system box in a traditional safe which can be bolted to your desk or floor.

Safemark 01904 677999

Government goes for voluntary snoop key

■ The Government has backed down from proposals that would allow encrypted messages to be covertly tapped. It still wants the ability to decode messages via a mechanism known as key recovery, which provides access to keys.

The John Major government wanted key recovery to be mandatory; Labour favours voluntary recovery. Some organisations fear the scheme gives too-easy access to confidential data.

The new policy gives legal status to digital signatures which allow you to provide your identity when buying goods online. *VNU Newswire*

p50 ➢

Fangs for the memory as Eidos leads us to Deathtrap Dungeon

State of Play
Games news from Etelka Clark

Deathtrap Dungeon is the new game from Eidos Interactive. Based on the bestselling Fighting Fantasy books by Ian Livingstone, the game includes devious puzzles and the most intricate dungeon designs ever seen in a game.

The story is set in Fang, the city of lost souls where the evil Melkor, a red dragon, has enslaved people. Players have to conquer rotting zombies, vicious skeleton warriors, ghosts and devils lurking in the Dungeon.

Deathtrap Dungeon will be available for the PC and the PlayStation.

Yet another mission pack, this time from Blue Byte software, is the add-on for the award-winning Incubation — and it's free. The Hidden Worlds includes ten additional missions and will be sent to Incubation owners who have returned their registration cards. It will also be packaged with copies of Incubation in stores nationwide.

Still with Blue Byte, rumour has it that The Settlers 3 is due to be released in October.

Activision has announced plans to extend the Heavy Gear Universe with the creation of its first 3D hardware-only game, Heavy Gear 2. Due for release this winter,

Heavy Gear 2 thrusts players into next-generation giant robot combat. It features lightning-fast action and ultra-realistic complex battlefields that include more vehicles and structures, indoor fighting and realistic weather effects.

For more information, visit www.activision.com.

● Games featured in Screenplay this month (*see page 321*) include Micro Machines V3, Forsaken, Legacy Of Time and a preview of Final Fantasy. There is also a comparison of the latest golf games.

Games shorts

■ Microsoft's Internet Gaming Zone is offering free matchmaking for Quake II. This allows users of the retail game to jump onto the Zone to meet and compete against other Quake II players.

The Zone will soon be matchmaking for all 1998 Red Storm Entertainment titles, including the new Tom Clancy's Rainbow Six and Dominant Species, both due for release later this year.

www.zone.com

Guide online

■ Game Guide, the trade guide to Nintendo, PlayStation and PC CD-ROM software, is now online. It contains release schedules, reviews, profiles and a guide to shops across Britain.

www.game-guide.co.uk

Top 10 Games

			Last month
1	Ultimate Soccer Manager '98	Cendant	-
2	Tomb Raider "Unfinished Business"	Eidos	-
3	Star Wars Supremacy	Virgin	-
4	Starship Titanic	Ablac	-
5	Lula: The Sexy Empire	Take 2	8
6	Speccy Classix '98	Prism	-
7	Virtual Springfield	E.A	-
8	Grand Theft Auto: Special Edition	BMG Interactive	-
9	Forsaken: Demo	Acclaim	-
10	Starcraft	Cendant	-

Top 10 Windows software

			Last month
1	Office Pro & Bookshelf U/G	Microsoft	5
2	Win95 U/G & IE 4	Microsoft	1
3	Nuts & Bolts (3.1+95)	Xatlantic	2
4	Office 97 STD C/VUP UG CD	Microsoft	-
5	Norton Anti-Virus V4 Deluxe	Symantec	6
6	Frontpage 98 FP CD	Microsoft	10
7	Personal Navigator 95 v2.2	Softwair	-
8	Partition Magic v3	Powerquest	8
9	MS Publisher 98 FP CD	Microsoft	14
10	Encarta Deluxe 98 CD	Microsoft	7

Top 10 CD-ROMs

			Last month
1	Virtual Springfield	Fox Interactive	1
2	Simpsons Cartoon Studio	Fox Interactive	2
3	3D PC Pup Pet	Neechez	6
4	Dance eJay	FastTrack	-
5	Music File 98	File Productions	10
6	Encyclopedia Britannica	Acclaim	7
7	Dr Solomon's Home Guard Antivirus	Dr Solomon's	-
8	You Don't Know Jack	BMG Interactive	-
9	Mavis Beacon Teaches Typing	Mindscape	-
10	Redshift 3	Dorling Kindersley	-

Top 10 DOS software

1	DOS 2 Win95 U/G with Internet	Microsoft	1
2	PC Anywhere v5 Host	Symantec	-
3	System Commander v3.0	POW	6
4	Novell Personal NetWare	Novell	-
5	Corel WP 5.1 U/G	Corel	-
6	Mail PC Remote 3.2	Microsoft	4
7	Turbo Pascal v7.0	Borland	3
8	Turbo Pascal v7 DOS Educ.	Borland	19
9	MSDOS v6.22 U/G	Microsoft	5
10	Corel WP 6.2 U/G	Corel	-

Top 10 peripherals

1	Umax Astra 610p	Umax	1
2	Umax Astra 1210p	Umax	6
3	ScanJet 5100C	Hewlett-Packard	3
4	Sportster Message + Ex	USR	5
5	Sportster Flash Ext	USR	2
6	Intellimouse v3.0 95	Microsoft	9
7	Sidewinder Gamepad	Microsoft	8
8	Umax Astra 610s	Umax	4
9	Sidewinder Precision Pro	Microsoft	10
10	AWE-64 Value ISA	Creative	15

Hot property

Startup screens are the real estate of the net and Bill Gates might soon have it all. Not fair! PC vendors should be allowed to stake a claim, says Tim Bajarin.

Location, location, location. That is the mantra of those in the real estate business who know how prices depend on which piece of land a property sits on. Bill Gates understands this very well and seems determined to own the real estate on every PC screen; real estate that is becoming prized as the portal to the internet.

This has yet to be taken on board by the US Justice Department which, as I write, seems likely to stop the introduction of Windows 98 and make Microsoft do some fine-tuning before it gets to market.

Compaq's latest DeskPro… but tiny margins are leaving little space for the smaller players in the market

The Feds' focus on the integration of Internet Explorer into Windows 98 overlooks the real anti-competitive threat and is a waste of time and money. Instead, they should be focusing on making Microsoft change its agreements with PC vendors which effectively give the company ownership of the start-up screens on all Intel-based PCs sold, with exclusive rights to put links to its own web-commerce content and to channel partners like Disney and ABC.

The PC is like a store where the manager cannot choose the merchandise nor where profits will come from. Instead, Microsoft dictates what can or cannot be sold, and then takes the profits.

Many vendors, threatened by falling PC prices and razor-thin margins, have asked me to suggest ways to get new or recurring profits beyond the PC sale itself. But the options are limited because all PC vendors have to agree to Microsoft's terms if they want to get Windows for their PCs.

If PC vendors could charge a commerce- or content-supplier rent on screen space on the PCs they sell, they would then have a new way to get profit for their PC business. An even better model would be for the PC vendor to give space to the commerce or content vendors, and then take a monthly service fee and a percentage of resulting sales.

Most PC vendors are too afraid to broach this subject with Microsoft directly. But if, as I predict, the Feds make this issue a key component of their new suit against Microsoft, I think PC vendors may secretly be rooting for them.

The plight of the PC vendors is serious. Market analyst IDC states that 50 percent of all PCs sold come from the top five PC makers. And even these five can make profits only on volume sales. Just look at Compaq's last quarter — it made only $1m on sales of over $1bn. I am convinced the PC vendors will realise they have to make Microsoft change its ways in order for them to be profitable. This will either come through some voluntary agreement, or via a Justice Department suit that would be hard for Microsoft to defend.

It has a reasonable case on the subject of innovation in an OS, but it does not have a good one for owning all PC screens. This will be the next battlefield for Microsoft, and one where the company will be fighting its vendor partner rather than competitors like Sun and Netscape.

● Most market researchers predicted in the New Year that the PC industry would grow at about 16 percent this year; about one percent higher than in 1997. Later figures estimated 12 percent, and the latest figures suggest that growth so far is about 14.1 percent.

The biggest surprise of the recent surveys was the fact that Dell has become the number two US vendor and IBM has slipped to fifth place. As expected, Compaq is still number one with 49 percent growth so far this year, giving it a 17.1 percent market share in the US. Hewlett-Packard (HP) is now in third place, followed by Gateway and then IBM.

Worldwide, Compaq is first and IBM second but with a mere 3.3 percent increase in global shipments. Part of IBM's problems can be traced to its late entry in the sub-$1,000 PC market in late 1997, months after Compaq and HP. Packard-Bell was the only top PC maker to perform worse than IBM, with shipments down 9.8 percent in the first quarter.

Demand for PCs is still strong, though. Dataquest and IDC both predict increased shipments in the next quarter. And we should end up with a strong Christmas quarter as prices for PCs continue to go lower. ■

Sounding Off

Never mind method acting or those delicate little nuances of delivery picked up at RADA. The future of film is decidedly digital, as Michael Hewitt explains.

Michael Hewitt

I remember once talking to Charlton Heston about the likelihood of computer-generated actors taking over from the flesh and blood variety. He reacted to the question much as my former boss, the MD of an old-style typesetting firm did, back in the eighties, when I asked him if he felt his business was likely to be under threat from this new-fangled DTP. No, he said, technology is fine as far as it goes but you need the human touch. The last time I passed the premises of that particular company, the human touch had manifested itself in the fact that the place had become a kebab house.

Could this be a harbinger of things to come in the film industry? Might we see Sunset Boulevard lined with competing fast-food outlets owned by redundant movie stars? Heston's Ten Commandments Burger Bar alongside Peck's Big Country Burrito House, perhaps?

Those of you who've sat through that arse-numbingly tedious film, Titanic, are probably aware by now that when you watch casting extras being mulched against propellers and squashed by falling smoke-stacks, what you're actually seeing are digitally-created characters. They fooled me at the time, though. I thought they were highly-paid stunt men. No doubt if I were to sit through the film again, I'd look for tell-tale signs like pixellation. The point is, though, on first viewing it was totally convincing. So how long before the foreground characters start being convincingly computer-generated, too?

To an extent, it's already happening. In days of yore, when the star of a film disobligingly dropped dead mid-way through a production, you had just two options: reshoot the whole thing with another actor, or carry on with a double and hope no-one noticed. The former was expensive, the latter a potential strain on credulity. For example, Bruce Lee's "double", who took over during the course of filming The Game of Death, finally proved to the world that all Chinamen do not in fact look alike.

Today, however, you have another option: carry on filming, using a digital copy of the actor. This is what they did (their stars' final credits having rolled prematurely) to finish John Candy's and Brandon Lee's last films. The actors were digitally extracted from scenes that had already been shot and then re-inserted into the remaining scenes to give believable continuity, reaction shots, and so on. And where actors aren't quite dead, yet, but you want to see them in something resembling their prime, computers can help there, too. In the coming months, we're going to be treated to a slimline Marlon Brando and a rejuvenated, 30-year-old Sean Connery, their images having been scanned and processed to take off the years and the flab.

So how far is it from what is, essentially, post-processing to the point where the actors can stay in bed while their digital doubles do all the work? Certain Hollywood hucksters don't think it's going to be long at all. One agency has already been set up specifically to handle dead film stars in the expectation that they'll soon be digitally resurrected and able to resume their money-spinning careers. But what about going one stage further and creating an actor from scratch?

I had a chat the other day with a man who ought to know what he's talking about because he worked on the Disney film Toy Story where all the characters were created by computer. He reckons that given the current state of play as regards processing power, storage and so on, and the way it's continually advancing, we're ten years away, maybe less, from the début of the world's first convincing all-digital actor. They've more or less sorted problems like creating movement and a realistic gait; all that remains is to work out skin tone and facial expression, and to create some sort of virtual Betty Ford clinic for when the digi-actor overdoes it on digital booze or cocaine.

Many, of course, would argue that merely creating the appearance of a character is the easy bit, as did the interviewee in a recent BBC2 Horizon programme on the subject of movie special effects. Without the talent of a genuine actor behind it, he said, your computer-generated figure is just going to move woodenly through the film like some sort of emotionless automaton. I think he's missing a point. What about cartoon characters like Bambi and Dumbo? They have personality. So much so, that children can identify with them and feel for them. I believe that Jessica Rabbit, from Who Framed Roger Rabbit, even became a sex symbol for adolescents. True, their personality derives from having a skilled animator create them. But what else is a computer technician who creates a digital actor except *a highly-skilled animator*?

The future of TV and cinema acting is probably digital. If I were graduating from RADA now, I might be inclined to pick up a few supplementary skills, like basic chip frying and burger preparation, just to be on the safe side.

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Straight Talking

Barry Fox reckons that many highly paid IT executives cannot actually explain how a product works. He put his theory to the test with a new product, FlashPath.

Barry Fox

It happened with hi-fi, then with video and now PCs. Only a handful of people inside the companies that sell high-tech systems have a clue as to how they work, and are far too busy to waste time explaining to the trade, press and public. Highly-paid executives do not want to be exposed as ignorant, so prefer to work with marketing staff who know even less than themselves.

The company employs glossy PR people who either regurgitate engineering literature without understanding it, or write "puff" which is so superficial that it is only of use to trade magazines which will print anything just to fill the space between the ads. Press releases end with a name to contact "for further information". Any journalist who tries to follow through soon discovers that this glib phrase means even less than "Have a nice day" in America.

The knee-jerk response to any question more complicated than the price, is to offer the product for testing. Say "No, I haven't got time" and you're damned as "…couldn't even be bothered to try it". Say yes, and struggle to make it work, and the answers are predictable: either "You're the first to experience any problems" or "It's only a Beta". So, it's always a joy to find a company with a product that works and knows *how* it works.

Fuji recently announced FlashPath, a device which lets a PC read the memory card from a digital camera without the need to install a card reader. The card slides into a device that looks like a floppy disc and then slots into a standard floppy drive.

Fuji UK offered "further information", so I asked the obvious question. How does it do the very clever trick of reading data from a stationary chip through a rotating disc drive? All I got by way of explanation was some daft talk about "software drivers".

Fortunately I found another company, Pipestrel of Guildford, which sells a similar system for reading data from smart cards. PhoneFile Pro lets anyone with a digital cellphone use a PC to store phone numbers and back up the data onto a PC. PhoneFile works like a dream, straight out of the box, reassuring me that it is possible to write Windows software that performs without error messages. And the people at Pipestrel were able to explain how Fuji's system works, as well as their own.

The concept of a smart disc was developed and patented in the early nineties by Raymund Eisele of Idstein, Germany. He sold the rights to Fischer International of Naples, Florida. Fischer's first product, Smarty, is now on sale in the US at around $60. Smarty reads smart cards which incorporate a microprocessor and a few kilobytes of memory. Pipestrel bundles Smarty with its PhoneFile software for around £100. FlashPath looks the same but reads flash memory cards.

Each device works on the same principle. A dummy floppy disc has electrical contacts which mate with contacts on the card and connect it to a Motorola microprocessor powered by a lithium battery. The microprocessor is pre-programmed to interrogate the card and read whatever data is stored in its memory. This data is converted into the standard format used for recording and reading floppy discs. The formatted data is fed to an induction coil which radiates a magnetic field from the dummy disc. Software forces the recording heads of the floppy drive to move into a steady position, as if reading track 0 on a disc. Although the disc drive spins, there is nothing for it to turn. The drive heads pick up the radiated signal from the coil as if it were coming from a disc, so the PC reads the data in the card. To store information in the card, the PC sends data to the disc drive head, as if it were writing to a spinning disc. The coil in the dummy disc picks up the magnetic signal, and the microprocessor reformats the data and writes it to the card.

In a confusion of names and joint ventures which make my eyes glaze over, Fischer has now formed a joint venture with Toshiba (Japan). The new company, called SmartDisk, will use FlashPath readers to communicate with the new SmartMedia flash memory cards made by Toshiba and Samsung for use in digital cameras. With a FlashPath dummy floppy, a photographer can shoot pictures into a memory card, then dump them into a PC simply by treating the card as a floppy disc. The pictures can be edited on the PC and returned to the card.

Digital cellphones are controlled by a smart-card SIM, or subscriber identity module, which can also store up to 200 names and numbers. Entering and editing the numbers by using the phone's alphanumeric keypad is so laborious that not many people bother to store more than a few. With PhoneFile and Smarty, you do it with a PC keyboard and screen.

I have no idea whether FlashPath works as well as Smarty and PhoneFile. Although Fuji had publicised the gizmos, they had not actually got any.

■ Barry Fox 100131.201@compuserve.com

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Business Matters

Business is missing out on a huge pool of IT talent just because it is simpler and safer to hire 'qualifications' rather than experience, suggests Brian Clegg.

Brian Clegg

I recently received an email from a *PCW* reader, Adam Webb, which makes some interesting points. "I'm 37," he wrote, "and left school long before computers became commonplace. My first experience with PCs came when, as a fiction writer, I bought a lowly 286 to replace my dedicated word processor.

"I soon realised how different it was, and feeling incredibly stupid, determined to learn as much as I could. Nobody was more surprised than I to discover that I had a natural aptitude for computers and software in general. That was ten years ago, and today I have a small business creating web sites, digital artwork, training people in computer basics using plain English, and other assorted tasks.

"Some weeks it goes well, other weeks it doesn't. So, why should this be of interest to you?

"The point I want to make is that there must by now be quite a large number of people who are entirely self taught in matters PC. People who, like me, have never been in the position where a corporation would pay for training but who nevertheless have acquired expert knowledge and literally years of hands-on experience with all manner of day-to-day problems — experience which I'm finding is generally ignored by medium to large companies. Because people like me rarely have the piece of paper that says they can do what they can do, we are not given a fair crack of the whip.

"I have a 266Mb digital portfolio, available on CD, which can prove my abilities, but this is often not enough to even make it past the first post, even when someone can be bothered to take a look. It is an attitude problem which I feel is ghetto-ising some of the most creative, genuinely experienced people in this country. People who had the gumption to teach themselves and the motivation to keep on going. It seems wrong to me that this situation exists in an industry which is moving so fast, that most qualifications are out of date by the time they are gained!"

This is not a trivial problem and it's one that more and more of us face. The job for life has become a fantasy. Most people are having to take more responsibility for their own careers and for what they do. This can be very satisfying (as Adam has discovered when it goes right) but there are real problems because businesses generally haven't caught up with new and exciting ways of working. At the risk of undermining Microsoft Certified Professionals or whatever (I always worry about someone who is proud that they are certified), there are no qualifications that should provide a certain passport into employment.

A degree is useful, because it shows that someone can apply themselves independently, but the subject is irrelevant. For example, computer science degrees often operate in a world that is quite detached from business computing. A doctorate or an MBA is particularly suspicious. To succeed with a doctorate you must be able to spend years working on fine detail; but business desires a broad-brush approach and quick work. As for an MBA, it generally means the recipient has a lot to *unlearn*.

At a lower level, specific programming qualifications like the Microsoft tests seem to be more aimed at remembering the syntax of a programming language than being able to produce good, solid code to generate an easy-to-use application. This is pointless. Modern development environments give programmers all the prompts they need and there's no longer any need to learn parameter calling orders.

So, if I were taking on someone like Adam, I would want an answer to: "What can you show me that you've done? How good is the user interface design? Let's see it in action. How long did it take to put together and how was it developed to meet the customer's requirements?" It's easy to be lazy, and the trouble is, this takes more effort than ticking a box for the appropriate qualification. Having good contacts is essential if you want to sell yourself this way. If you can get to the right people, they're only interested in what you've done; they don't care what training you've had.

The best way to find IT work in business, whether you're designing web sites or writing programs, is to find something unique about yourself. In Adam's case he's got a winner, the ability to communicate in writing (so much business writing is impenetrable). The combination of being a writer and an experienced web-site designer should have people knocking down his door.

If you'd like to find out more about Adam's work, see his web site at members.aol.com/graphicsUK. I've got more information on ways of selling yourself to business on my own site at www.cul.co.uk/chameleon.

If you've had experiences of being in this position, drop me an email. I would be interested to read them.

■ brian@cul.co.uk

From the desktop

Two's company, and an overcrowded, ultra-packed hard disk is very much a crowd. Tim Nott spins a cautionary tale about space-saving and partitioning.

Tim Nott

I celebrated the first anniversary of Windows 95 by buying a new 1.7Gb hard disk. I had previously been dual-booting Windows 3.11 and 95, running applications and reviewing software all on a 500Mb drive, with no compression. Hard to believe, isn't it? But a 500Mb drive was a mid-range standard when Windows 95 first appeared.

Being the kind of smartarse who Knows About Such Things, I divided the new disk into multiple partitions. The first 500Mb partition was destined to host Windows, MS Office and a few other permanent denizens like Paint Shop Pro. The second 500Mb partition was for data, and the third for visiting review software and various other applications. This left a small partition which was more than adequate to contain Windows 3.1 and various legacy 16-bit apps.

The smartness of the arse wasn't in the classification (it would have been much simpler to do this with folders) but in the fact that all the partitions were below 512Mb. This meant that the FAT file system assigned disk space in 8Kb "clusters" rather than the 32Kb that would have been the case had I left it all as one partition. Result: more efficient use of disk space, especially with very small files like Shortcuts which, although only consisting of a few hundred bytes, must have an entire cluster assigned to them. Feeling duly smug, I sat back and contemplated the vast tracts of empty disk space.

That was then. But this is now, when I feel like one of those old codgers who say "I can remember when it was all fields round here". It's now getting so crowded that I have to embark on periodical slum clearance programs.

My Windows folder, which I remember saying in 1995 was a "hefty 80Mb", is now, thanks to the advancement of technology and the advent of Windows 98, a staggering 265Mb. Add to this all the stuff that insists on being in Program Files, the profusion of fonts that everything wants to install, the Windows swap file and breathing space for various temporary files, and my C: drive is starting to bulge at the seams.

When things really get bad, the PC seems to grind towards an agonising entropic death. The printer won't print. Applications report "out of memory" errors, even with 64Mb of finest silicon installed. And Windows 98 pops up helpful little messages saying that I'm running out of space on drive C. Gee, thanks, but I'd already twigged that.

So who is the culprit here? And can anything be done? Is this C:-jam the result of errant developers not keeping to the Microsoft true path of installation routines? Frankly, no. The main culprit, at least on my PC, is Microsoft. The final straw was Publisher 98, which wanted to install 80-something megabytes of clipart to drive C. No, you can't have it anywhere else. You *can* leave it on the CD-ROM, though; just don't expect the wizards to work properly, that's all.

Yes, there are things that can be done to move applications and clear space, but *please, don't write in and tell me about them*. They are mostly tedious and require a degree of expertise or the intervention of third-party software. And all take up time that would otherwise be better spent. The highly-profiled "ease of use" of Windows 95 is fine until it has you backed up against the wall and you need to do something that Redmond's finest hadn't quite envisaged.

I'm sure I can't be the only one in this predicament. There must be thousands of fellow victims of their own foresight who've also watched, helpless, as their C drive is gradually wrested from their control. Happily, there's a solution that comes as part of Windows 98. It is FAT32. This uses even smaller cluster sizes without having to split a disk into several partitions, and does away with the absolute 2Gb partition limit of FAT16. Though the latter might not be an immediate selling point for most users, it's a godsend to those using large files such as video. And I bet by the time Windows 2001 or whatever makes its début, 2Gb will be barely enough to install Windows, IE6 and their attendant paraphernalia. But let's get back to the here and now.

Is that FAT32 going to help you out of the C:-jam? Well, there's a Wizard to help you convert existing drives to FAT32, except there are a few catches. One is that if you've already accepted the poison chalice of disk compression, you're stuck with FAT16. There are various other catches, but my personal favourite is that if a partition is under 512Mb, once more you're stuck with it. The Wizard won't convert it, nor will it do anything sensible like change the size of a partition. For that you'll either need third-party software such as Partition Magic, or you'll have to back up all your data, including such things as your personal MS Office Autocorrect dictionary, which apparently is such a delicate piece of data that it can only blossom in C:\Windows). Wipe the disk and start again. Good luck. This is what Microsoft would undoubtedly call a "migration issue".

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Letters

Each month we are offering a 17in Taxan Ergovision 750 TCO95 monitor to the winner of the Star Letter. So why not write to us? You could be the winner. You won't regret it!

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Tools of the trade

Michael Hewitt *(PCW* June) says: "As a research tool ... and as a source of readily available topical news material [the internet] has become virtually unusable". I suppose it depends how you define "research", but that statement seems pretty dubious to me. Yes, there are many limitations in the information content of the internet which are not well understood by most users, but more pertinently, they do not use it effectively because all too often they think the only way is to search (usually badly) Alta Vista, Infoseek and the like.

For academic use, the best route is more likely through a general subject gateway like BUBL LINK <www.bubl.ac.uk> or a specialist one like SOSIG <sosig.ac.uk> for social sciences or EEVL <eevl.ac.uk> for engineering. For a list, see <www.hw.ac.uk/libWWW/irn/pinakes/pinakes.html>. These collections have resources that have been selected by librarians and other information experts against particular criteria for usefulness. And by the way, most reference libraries got rid of "record cards" years ago when they computerised, and their catalogues are now likely to be on the web <www.niss.ac.uk/reference/opacs.html>.

Ian Winship
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School of thought

I agree with Chris Norris (*Letters, PCW May 98*). As a 16-year-old boy attending school in Staffordshire, we are given a say in how our school is run. Our IT facilities are very good, and the teacher in charge calls on certain students to help him with the day-to-day running of the system and the four computer rooms. He certainly appreciates our help, and understands that in some circumstances, the students do know more than the teachers.

Maybe Mr. Charlesworth should take note that in yet another school, the students' views are listened to carefully. Does he not believe that children should have a say in their own education, or is he afraid to admit, like some teachers, that their child counterparts are more knowledgable than themsleves in some areas?

Julian Cotterill
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STAR LETTER

From small Acorns, good programmers grow

I started reading *PCW* in 1978, at the ripe old age of 13. My first computer was the much-underrated Acorn Atom which had high-resolution graphics (256 x 192) and a built-in 6502 assembler, and came with a manual, "Atomic Theory and Practice", which was so good it was highlighted in reviews. Before long, I had written a Space Invaders program suitable for the minimal-spec Atom which I sold to BugByte Software. It was only around half a kilobyte long.

I can't help thinking that the reason British programmers have traditionally been highly regarded is that the early micros in this country weren't as powerful as overseas machines like the Apple II. This meant we had to be far more clever to achieve the same results. Of course now, even the most basic machine is ridiculously powerful, the "advantage" has been lost, and the "bloatware" we see around us is the result.

Which is why I think Java is interesting. Suddenly, we need to write tight code again because it is interpreted rather than compiled. And the code has to be compact because it needs to be rapidly downloaded from a network.

Perhaps this will result in another generation of clever programmers, and the cycle can start anew.
Wildgoose@compuserve.com

Amen to that. Despite reviewing the latest applications, many of us at PCW prefer to use older versions day-to-day since they're often smaller, faster, and offer more than enough functionality. We hope your prize of a new monitor will inspire you to write particularly compact code.

p67 ➢

Handhelds in Hands On

May I suggest a Handhelds column for *PCW*'s Hands On section? With the emergence of PDAs, and the battle between the various OSs (EPOC, Palm, Windows CE etc) this would be an excellent addition.

Andy Marston Andy@IBM.NET

You must have read our minds. A new Hands On section devoted to Handhelds/PDAs starts this month on page 264. Please email Mark Whitehorn with any of your suggestions or questions for this column.

The Psion Series 5 will feature in our new Hands On column

World service

Michael Hewitt should have subscribed to IBM Internet, with (almost) worldwide pops for today's Road Warriors. As a constant traveller, I have found that even when living in Greece, as I do for two months each year, Big Blue has the answer with three POPS in that country and even more in the UK.

Greece does have modern digital telephone switches and uses satellite for both internal and external communications. On Santorini, as with other Cyclades islands, the long-distance carriers are "daisy-chained" with incremental degradation of the signal-to-noise ratio, forcing modems to switch to lower speeds.

I am emailing this letter from Nha Trang, a city about 400 miles north of Ho Chi Minh/Saigon in Vietnam, where I can enjoy the newly approved internet services: there is even a POP in this provincial town. The best answer to Michael's problems is to subscribe to a free store or forward email service such as Bigfoot or Altavista.Net which survive even the Chinese habit of clearing email servers every night!

What's more, they are free, and there are no government snoops reading or censoring your mail, which is kept on servers in the West.

Internet cafés are to be found in Greece and Vietnam: a ready, economic form of access.

Jon Hewson
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The DVD debate

Andrew Fish (*Letters, PCW June 98*) explains that DVD is a good idea, but there are a couple of points that weren't quite valid.

I agree that DVD will be a good thing when the standards are sorted out. Mr Fish quite rightly says that there are nearly a thousand good DVD titles in the USA. However, these titles will not play back in the UK if they are encoded regionally.

For DVD to replace VHS recorders, it must be able to record as well as play back discs. This needs a real-time MPEG 2 encoder and DVD-RW drive. Not only do we not have this technology yet, but we'll have to wait at least two years after DVD's release for the price to fall to an affordable level.

p68 ➢

Down memory lane with *PCW*'s 20th Anniversary

Plus points: the return of Jack Attack

Having finally read every page of your 20th Anniversary issue, I was surprised to find no mention of the Commodore Plus 4. This was my first computer, and I must have wasted years of my life playing Jack Attack, possibly the most addictive game ever.

Fortunately, Mike Dailly has written a free emulator of the Plus 4, available from www.scotch.demon.co.uk, allowing me to relive the golden years of my youth.

Keith Wickham
keith.wickham@mail.virgin.net

Carton capers

In May's Anniversary issue you commented that the Sinclair ZX80 was hard to crash. One of my friends who owned one said it was actually quite easy. He remembers having to put a half-filled carton of milk on it to make it load.

Steve Scott
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Getting the message about BBSs

First, may I congratulate you on your 20th Anniversary and the excellent May special issue. But, writing on the evolution of browsers and the net, Clive Akass gave the impression that Bulletin Board Systems are a thing of the past, and that "communication between them was difficult or impossible, so global email did not exist".

Neither statement is true. BBSs are alive and well, and provide an exciting and low-cost alternative to the internet. The BBS community, both here and abroad, is thriving and welcoming. All you need to join is a terminal program — even Windows Terminal will do — and a modem.

BBSs are run by enthusiasts, almost exclusively on a non-profit basis. You pay only phone charges, and there is sure to be a board local to you. Once online you will find a wealth of files, online games and access to global — yes, *global* — mail networks, such as Fidonet. This may well be in addition to your FREE internet email account, which many BBSs also offer.

Fidonet, like Usenet, is long established with hundreds of conferences. Selected Usenet conferences are also available from some boards. For any readers interested in finding out why BBSs flourish alongside the mighty internet, here is a selection (you will find many more advertised when you are online):

- Axiom 01242 693785
- Boiled Sweets Music 0171 686 0135
- Metric 01705 871471
- OOH! 0181 669 0101
- The Dog House 01443 400327
- The Ninja 0161 283 1098

Fidonet can be found on the net at www.craybbs.co.uk/foti/ .

Tim Cook tim@ooh.dircon.co.uk

Clive Akass replies: The internet provided a robust, fast, extensible, global mailing system on a scale that BBBs could never match. It joined everyone up. Moreover, you cannot ring a BBS in, say, Washington direct for the price of a local call, but you can reach a Washington net site at local rates.

This is not to denigrate the pioneering work of BBSs, nor to suggest that they no longer operate.

VHS tapes currently cost around £1 each and can store up to four hours of acceptable-quality video. A blank DVD-RW disc will costs £30 to £50 and may only contain a couple of hours of good-quality MPEG-2.

Compare it to audio tapes vs CDs. CDs are bought to be played back, but there are tens of millions of people out there with cassette recorders instead of CD-RW drives, despite being of a lower quality, because of the cost of the drive, and I fear the same will occur with DVD-RW drives vs video tape.

David Butler
dbutler65@hotmail.com

Gordon Laing replies: It's funny that the public seem to go for many high-quality playback devices, but will accept mediocre recording formats. When you also consider the fact that the software companies tend to get upset at the prospect of high-quality domestic recorders, it's no wonder none have taken off en masse. Where does this leave DVD video recorders?

As you say, such a device is dependent on rewritable drives, cheap media and decent real-time MPEG-2 encoders, all some way off. However, with digital broadcasting, we should receive pre-encoded MPEG-2 digital bitstreams into our homes, rendering a real-time encoder redundant.

Perhaps in the not-too-distant future, the only domestic analogue video capture unit will be the camcorder, and the DV format has already taken care of the digitising side of that. When considering convergence, it's also interesting to note the reactions from two different communites: PC users would jump at 4Gb rewritable media at only £30 a pop, whereas the same price for a couple of hours of domestic video recording suddenly doesn't seem such good value. The consumers will vote with their wallets.

I should point out, however, that "under-the-counter" modifications may be made to certain DVD players to allow them to replay discs from multiple regions. Watch out for early solutions which actually clipp legs off chips, leaving the player believing it is Region 0, or all-regions. New Region 1 US software actually looks for a Region 1 hardware flag and may not work on these early, modified players.

Switching on for scanning

Following your recommendation I rushed out and purchased one of the Umax parallel port scanners from my local Comet. I was surprised to find that connecting the printer through the scanner, as advised, I am only able to print when the scanner is on.

Al Holman
AlHolman@Wskisoft.co.uk

This is true. The device in the middle needs to be powered up for the one on the end to communicate with the PC properly. Like external SCSI devices, it's also advisable to switch on parallel devices before starting the PC. ■

Gadgets

Compiled by Adam Evans. Photography by David Whyte.

Toast of the town: an *haute couture* hard disk

First launched in 1993, this gorgeous piece of kit is part of La Cie's range of designer storage drives. The large 5.25in format aluminium casing, designed by internationally renowned designer Philippe Starck, came to be known as the "toaster" by users, owing to its resemblance to large 1950s-style toasters (*Can you see the resemblance? We can't — Ed*). Beneath the sexy surface lies a smouldering powerhouse of raw storage power. The "toaster" ships in 8Gb, 18Gb and 36Gb solutions, with two types of configuration. This kind of capacity and style costs serious money, and if you have to ask the price, you can't afford it.

Price £1,833 (£1,560 ex VAT)

Contact La Cie 0171 872 8000 www.lacie.com

Look Sharp now

Sharp describes the MC-G1 as its "first voice- and message-centric Personal Mobile Communicator" — phew! In simpler language, it's a combined mobile telephone and digital filofax. Instead of a keyboard, it has a touch-sensitive screen which can display names and addresses, appointments and even a telephone keypad. Handwritten memos and drawings can be scribbled onto the screen. Need access to your email when you're on the move? It's no problem with the MC-G1: it can send and receive email over any POP3 account. Connecting the unit to your PC lets you transfer contact and calendar information. **Price** Around £300 (depending on airtime agreement)

Contact Sharp 0800 262958

www.sharp-uk.co.uk

Driving me crazy

A steering wheel is a must-have item for racing game fanatics. The PC TopDrive Wheel from Logic 3 is based on the award-winning Tri-format TopGear Wheel, already available for the Nintendo 64 and the Sony PlayStation. It is packed with features, including self-centring technology, six fire buttons and an eight-way D pad. You can alter the amount of turn the wheel produces for games with very tight corners and the classy, removable, leatherette cover makes for enhanced grip. The TopDrive Wheel comes complete with a gear stick (on the wrong side for those of us who drive on the correct side of the road) and spring-loaded racing pedals (*pictured, right*).

Price £59.99 (£51.06 ex VAT)

Contact Spectravideo 0181 902 2211 www.logic3.co.uk

Flying high with RSI

The Video Flyer-384 is a lightweight, portable videoconferencing (VC) system from RSI Systems. The stylish unit connects to any television, projector system, PC or Mac. It can be used in conjunction with a computer or on its own to connect to any standards-based VC system. The remote control allows you to access all the capabilities of the system, from document transfer to VCR recording. A number of accessories are available for the Video Flyer, including a variety of cameras, speakers and travel cases for the videoconferencing executive on the move.

Price (To be announced)

Contact RSI Systems +31-20-301-2235 www.rsisystems.com

Slimline smoothie for scanning simply

The CanoScan 300S is the latest sheet-feed scanner from Canon. Measuring just 300 x 70 x 73.5mm and weighing a measly 1.5kg, it will fit in just about anywhere — Canon claims you can even fix it to a wall. It has a variety of functions including quick scanning, automatic document size correction, shading correction, gamma correction and selectable paper paths. It scans at 300 or 600dpi and supports paper weights of between 60 and 250gsm. As far as size goes, it can handle anything from a business card to a full A4 sheet.

See our First Impressions section (*starting on page 76*) for a full review of the CanoScan 300S.

Price £233.83 (£199 ex VAT)

Contact Canon 0121 666 6262 www.canon.co.uk

Barking up the right tree with a Super Woofer

Don't like the sound your PC speakers make but can't see why you should buy a new set? Sony may have the answer with the Active Super Woofer. It is a sub-woofer which plugs into your existing speakers, taking over the bass and improving the overall sound quality enormously. Games and music sound a million times better with a sub-woofer in the equation — well, maybe not a million times, but you know what we mean. A built-in power amplifier produces a dynamic 25W output, and there is a Turn Over control to adjust the point where the bass level of the woofer and the connected speakers are balanced.

Price £99.88 (£85 ex VAT)

Contact Sony 0990 424424 www.sony.co.uk

First Impressions

The power of theThinkPad is on show **(p79)**, as is the tiny functionality of the Toshiba Libretto **(p82)**. Sharp makes an entrance with a colour palmtop **(p87)** and Kodak exposes its DC200 on **p92**. Visual J++ storms in at version 6 **(p99)** and Painter comes out for an encore **p94**.

Hardware

Compaq Presario 4860

Paint it black: it's just what Compaq has done here, but style does triumph over substance.

Compaq has gone for a design statement with this black Presario 4860 and our guess is you will either love it or hate it. But if you love it, bear in mind that most computer peripherals are encased in dull, beige plastic and replacing the monitor, keyboard or mouse will leave you with a system where the colours do not match.

We weren't that keen on the design and found it strangely reminiscent of Dusty Bin from TV's "3-2-1". A plethora of buttons across the monitor fascia are duplicated on top of the case, and the JLB speakers, although providing excellent sound quality, together with the depth of the monitor, turns this machine into a real desk-hogger.

The heart of this Presario is a Pentium II 333MHz chip with 64Mb SDRAM and 512Kb pipeline burst cache. The 5.25in 8Gb Quantum Bigfoot IDE hard drive which, in our tests, achieved a data transfer rate of 9869Kb/sec, is installed vertically inside the case, and a further internal 5.25in bay allows for a second drive. Externally, expansion is via two free 5.25in bays.

Graphics are taken care of by an ATI Rage Pro card. Its 4Mb on-board RAM ensures that even at high resolutions we were able to display a very broad spectrum of colours. It is also mounted directly onto the motherboard, freeing up an extra expansion slot and doing away with the need for an AGP slot. But this does mean you are stuck with this graphics controller, as there is no way to add a different AGP card in the future.

That's entertainment

The usual CD-ROM drive has been replaced by a DVD drive, making this machine ready for the next generation of software and entertainment titles. We were disappointed that the design of the case, which had a door on the front hiding the drive, necessitated the pressing of an external button which in turn pressed the drive's own button. We found this difficult to operate, and ended up opening the door each time (through which the DVD tray would otherwise slide) to use the drive's button instead.

Opening the case reveals a messy bundle of wires, but we were impressed by an ingenious shield of metal which, when pulled out horizontally, leaves all the expansion cards on a single daughterboard, making the installation of new cards into the one free PCI, two free ISA and two free shared slots fairly pain-free. This also reveals the three memory slots, only one of which is free, with the 64Mb installed on two DIMMs. A Compaq-badged 56K modem is installed for internet connectivity and on-board ESS sound chips handle the sound.

Put a socket in it

The keyboard was disappointing, feeling unresponsive and fragile, and the mouse was a little too small for the average hand. Video-in and left and right audio-in phono sockets are visible through a smoked plastic window in the front flap of the machine, but using them would mean leaving the door open at all times. All other sockets and plugs, with the exception of the power lead, are colour coded to stop users plugging the wrong component into the wrong

Contents

VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and for the most part are based around industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the Sysmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

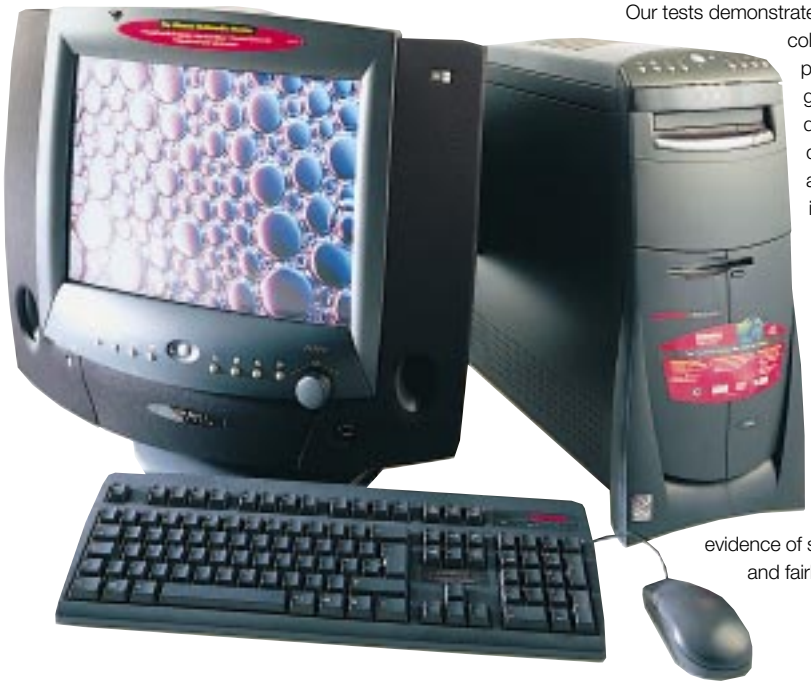
Ratings

★★★★★	Buy while stocks last
★★★★☆	Great buy
★★★☆☆	Good buy
★★☆☆☆	Shop around
★☆☆☆☆	Not recommended

place; a practice we wish more manufacturers would follow. We were disappointed, though, to see that there was just one serial port. Although it could be argued that the inclusion of two USB ports reduces the need for a second serial port, USB devices are not yet sufficiently common to fully justify this argument.

Microsoft Works 4.0 and Quicken 6 are pre-installed, and seven other CDs, such as Encarta 98, iPhoto Express and the Ultimate Human Body 2.0, are included. Compaq includes a comprehensive User Guide which even goes as far as explaining how to install extra memory.

The USB option makes the 17in Presario FX700 monitor a very functional unit. Direct access to CD controls, display properties, multimedia volume functions and a single user-definable function from the front of the unit means that you can use the more intuitive hands-on approach you would expect of a television, rather than the mouse-controlled Windows interface.



Our tests demonstrated an even colour purity, no pincushion or geometric distortion at the default setting, and sharp fine-image detail. There were no visible raster lines and only minimal loss of focus on the edges of the viewable area. There was slight moiré on fine test patterns, evidence of slight streaking, and fairly bad image expansion and contraction problems when bright blocks were applied to a black background.

It demonstrated no colour mis-registration or convergence errors on either horizontal or vertical test patterns. It comfortably achieved a resolution of 1280 x 1024 and had a maximum non-interlaced 1024 x 768 refresh rate of 85Hz. Controlled from the Windows interface, even "degauss" had a button in Display Properties.

Nik Rawlinson

PCW Details

Price £2,799 (£2,382.13 ex VAT)

Contact Compaq 0845 270 4000
www.compaq.co.uk

Good Points Colour-coded leads.

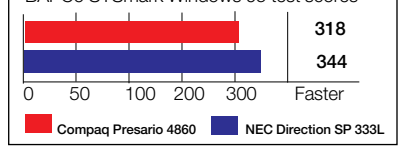
Bad Points Excessively noisy floppy disk drive. Messy interior.

Conclusion A disappointing product from Compaq.

★★★☆☆

Performance results

BAPCo SYSmark Windows 95 test scores



p78 ➢

Hardware

HP Pavilion 3250

Hewlett-Packard has rather let itself down here: a PC that's far too slow and way too expensive.

Hewlett-Packard's new Pavilion 3250 is HP's entry-level domestic model. Straight out of the box, we wanted to like it. It's an exceptionally slimline machine, with one of the smallest cases we've seen for a long time. It's not PC beige either, although we're not sure that battleship grey with a darker trim is much of an improvement if you want it for your living room. The monitor looks nice and cheery if you hang the speakers on each side. However, it's not aesthetics that count.

Entry-level it may be, but cheap it ain't. HP will relieve you of £1,300 if you would like this Pavilion with a 15in monitor — far too much for a P233MMX with 32Mb of RAM. Even given the undoubted premium for that discreet Hewlett-Packard logo, we'd expect a reasonably specified Pentium II machine for this price.

Bad timing

Instead, we found a Pentium MMX chip: not a good sign when it arrived a week after Intel announced both the launch of Celeron and the Pentium's demise. The chip itself isn't too bad when twinned with plenty of RAM, and the 32Mb here ensures that, although this machine isn't a flier, it should be a respectable enough performer. There's a reasonable 3.2Gb hard disk and a 33.6Kb/sec modem.

Again, this is perfectly adequate, but it looks slightly dated given that it's got a Lucent chipset and the company was one of the leading lights in the K56flex partnership. There's no mention of flash upgradability, which is disappointing when the V.90 standard for speedy modems has been agreed and seems only to need rubber-stamping.

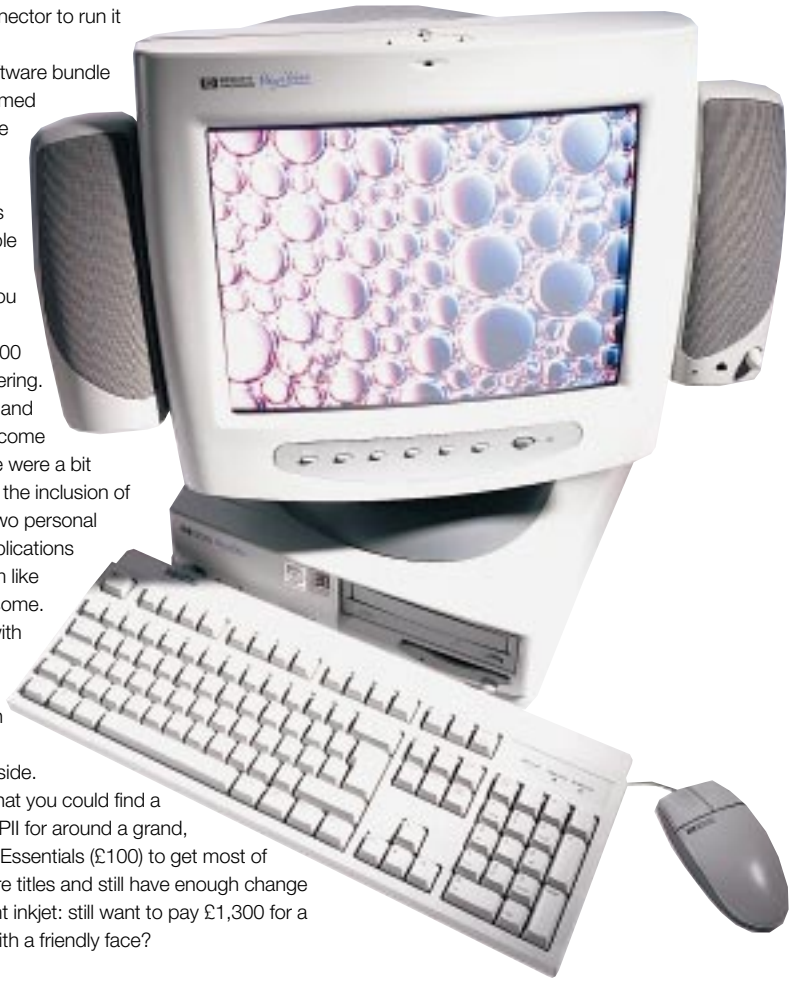
Grim graphics

The marriage of speakers and "industry-compatible" (we think they mean SoundBlaster compatible) on-board sound is a fair one, but it won't please a serious gamer or show off multimedia discs to best advantage. Graphics are on-board too, and are more of a concern.

Given the choice, we would not want an ATI VT2 chipset soldered to our motherboard. Respectable in its time, it is now two generations out of date. And although its 2D performance is fine, its 3D Final Reality mark was pretty grim. It is not DirectX-compatible in any meaningful sense, and will be a terrible bottleneck if you want to play state-of-the-art 3D games on this machine.

The Pavilion isn't really suitable as a base for upgrading either. One of the usual trade-offs for such a compact case is a dearth of expansion slots, and there is no exception here. A riser card carries one PCI and two ISA slots, although you can use only two of the three at the same time. There is just enough room to squeeze in a second hard disk, but there is no spare power connector to run it from.

The software bundle is clearly aimed at the home user, with Encarta World Atlas and a couple of games, although you only get SimCity 2000 after registering. MS Works and Money 97 come too, but we were a bit puzzled by the inclusion of Quicken: two personal finance applications might seem like overkill to some. But even with all this software, the Pavilion is on the expensive side. Consider that you could find a mail-order PII for around a grand, buy Home Essentials (£100) to get most of the software titles and still have enough change for a decent inkjet: still want to pay £1,300 for a machine with a friendly face?



Making a mistake

With this sort of spec, the Pavilion 3250 falls uncomfortably between two stools. It's not right for a home user, with its twinning of obsolete graphics and a soon-to-be-discontinued processor, and it's certainly not right for businesses even if HP had been targeting it at them. Corporate buyers have certainly been ready in the past to pay a premium for a good brand name and the accompanying reassurances of long-term backup and service agreements. However, a basic workstation — and the Pavilion will be quite happy on a diet of Word and Excel — doesn't need a modem, sound card or speakers, nor their associated costs.

Hewlett-Packard seems to be repeating IBM's mistake of fobbing home users off with slow, outdated PCs. The message should be clear enough: games are extremely demanding and many home users play games.

The Pavilion's undoubted build quality and good looks can't redeem its disappointing performance and high price.

John Sabine

PCW Details

Price £1,299 (£1,105.54 ex VAT)

Contact Hewlett Packard 0990 474747
www.hp.com

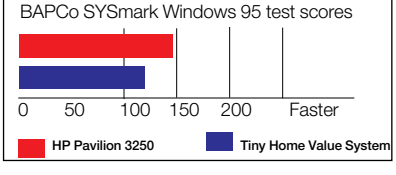
Good Points It's compact, neat and tidy.

Bad Points It's too slow for home use and virtually impossible to upgrade.

Conclusion HP could do much, much better.

★★☆☆☆

Performance results



Hardware

IBM ThinkPad 600

Think hard about this ThinkPad. Pricey it may be, but its superior build quality speaks volumes.

The new ThinkPad 600 series is being promoted on the back of its technology and portability. You get a choice of processors with the slimline ThinkPad 600: either the brand-new Intel Mobile Pentium II processor (up to 266MHz) or a 233MHz Pentium processor with MMX technology. The model we reviewed had a 266MHZ Mobile PII, the top of the range. It came with 32Mb SDRAM, which is supplied as standard. Although 128Mb modules are not yet available, IBM assured us that the 600 will support them, ensuring that you'll be able to upgrade to a maximum of 288Mb RAM when they arrive. It also came with a 4Gb hard disk.

Surprisingly, the ThinkPad 600 didn't score as well in our 2D application benchmark (SYSMark) test as the other Mobile PII notebooks in our group test last month. They all came out with scores over 200, but the 600 only scored 196. Its processing power really stood out with only one type of application, the desktop graphics package, which scored over 300. It also only scored 1.46 overall in our 3D benchmark, Final Reality. On the flip side, though, it didn't seem to get very hot, and the fan was in no way obtrusive.

Zooming into video

Although its processing power was not particularly exceptional, the ThinkPad 600 comes into its own with its display. The 13.3in TFT display gives a maximum resolution of 1024 x 768 and supports zoomed video. It also came with 2Mb SDRAM video memory. The display was not only bright, crisp and even, but came with a manual brightness control, a relatively rare but handy feature.

The 600 comes with a CD-ROM drive in its UltraSlim bay on the front. This can be swapped with a floppy drive, but IBM provides a sturdy external floppy drive that can be plugged into the side of the notebook. This setup will be helpful for the type of person who gives presentations from CD-ROMs, but not so helpful for those who like to work with word documents or spreadsheets from a floppy disk.

Several of the ports are covered by rubberised doors that seem a bit flimsy at first, but will actually go a long way towards preventing the door hinges from snapping off. The 600 comes with two Type 1 PC Card slots (or one Type 2 slot) as well as USB, infra-red and PS/2 ports. It has the SelectaBase 600 port replicator, which can be used as a docking-station port. The modem port, which was sealed on the model we looked at, will support UK phone jacks. The 600 supports only one lithium ion battery, and only one was supplied. After a full charge, it ran for 3 hours 11 minutes before it gave out.

Right on Track

The nicest feature on the 600 was the enhanced TrackPoint pointing device. This was the nicest mini-joystick I've ever used. Not only does it have a rough texture to keep your finger from sliding off, but it also had a bit of "give" to it, which made it ridiculously easy to control. You can also now simply tap the TrackPoint, rather like a left mouse button, to quickly open applications and documents. And there is a programmable centre button beneath the right and left mouse buttons that you can use to scroll quickly through large documents, spreadsheets or web sites, although it took us a while to figure out what this was for.

Excellent build quality

The overall build quality of the ThinkPad 600 is up to IBM's usual excellent standards. It's thin (33mm) and lightweight (2.3kg), making it almost a pleasure to carry around. It closes with a satisfying click, although I tended to fumble with the buttons to get it open. The keyboard had a pleasant bounce to it and the wrist-rest was excellent, although the mouse buttons were nothing exceptional. The tinny top-mounted speakers were an ear-grating disappointment.

IBM bundles a selection of its superior system utilities, including ConfigSafe 95, IBM AntiVirus 3.0, IntelliSync 97 and either Netfinity or LANDesk Client Manager. The 600 features the new Wake-on-LAN and Netfinity features, and is DMI-compliant. It also comes with PointCast Business Network and Lotus SmartSuite 97. You get a Restore CD (which our labs described as "fabulous") that can restore your operating environment without a single headache.

The ThinkPad 600 buyer will be drawn to it more by prestige and build quality than affordability. It is not designed for the mass-market user, but rather for the road warrior who needs a machine that is light and durable. Its thin format and beautiful display are likely to be its two major selling points, but users requiring maximum portable power may want to do some comparison shopping first.

Susan Pederson

PCW Details

Price £4,266.43 (£3,631 ex VAT)

Contact IBM 0870 601 0136 www.uk.ibm.com

Good Points Bright, crisp TFT screen and thin yet sturdy design.

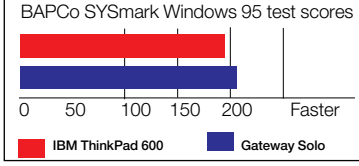
Bad Points Processing power not as high as some other models.

Conclusion A good solution for someone who is willing to pay out for superior build quality.

★★★★☆

Performance results

BAPCo SYSmark Windows 95 test scores



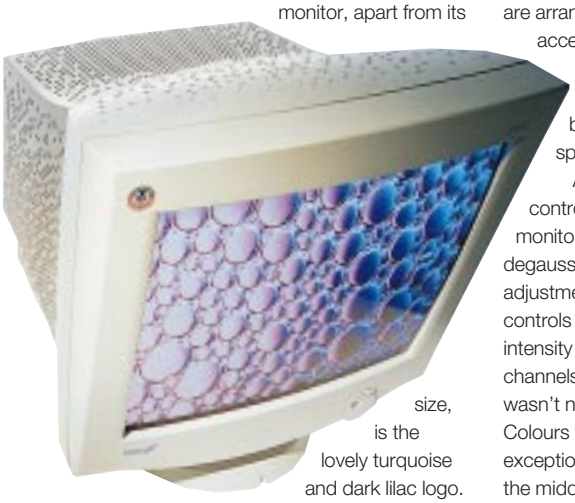
p80 ➢

Hardware

Mag Innovision DJ800

This 19in monitor sports a nice lilac logo and a rather fine array of on-screen controls.

Where once there was a trickle of 19in monitors on the market, there is now a flood. Mag Innovision has boosted the numbers with its latest offering, the DJ800, which has a diagonal viewing area of 18in. Like the majority of 19in monitors, MAG has opted to build around Hitachi's high-contrast flat screen tube (FST). The first thing to grab you about this monitor, apart from its size, is the lovely turquoise and dark lilac logo.



The plastic moulding around the screen does make it appear larger than it really is, as well as providing a nice touch of styling. We did find the power switch difficult to locate and exceptionally stiff to use. The on-screen display (OSD) is accessed by pressing a large knob at the bottom of the screen. The controls in general are a delight to use. Icons representing each feature are arranged in an oval shape, and you can access each by simply dialling through the selection. Although we would have preferred dedicated controls for the brightness and contrast, this OSD offers speedy access to most functions.

As well as the usual sizing and geometric controls that you would expect to find on any monitor worth its salt, the DJ800 offers manual degauss, rotation (tilt), parallelogram and bow adjustments. We were also pleased to find controls for adjusting colour temperature and the intensity of the colours in each of the RGB channels. You can adjust for moiré, although that wasn't necessary with this particular model. Colours were strong and vibrant, and focus was exceptionally crisp, in all four corners as well as in the middle of the screen.

The monitor connects to a PC via a D-Sub connector only. No BNC connectors are available. While it offers a non-interlaced maximum resolution of 1600 x 1200, this is only at a flickery 60Hz. However, it can manage a non-interlaced resolution of 1280 x 1024 at a steady refresh rate of 75Hz. It has an EPA Energy Star rating, as well as meeting VESA DPMS DDC 1/2B power management requirements. If you are worried about emissions and ergonomics, the DJ800 is also compliant with the TCO 92 standard.

Lynley Oram

PCW Details

Price £468.83 (£399 ex VAT)

Contact MAG Innovision 0118 975 2445 www.maginnovision.com

Good Points Image quality. Price. On-screen display.

Bad Points Stiff power switch. No separate brightness and contrast controls.

Conclusion A good, sturdy monitor.

★★★★☆

BT Prologue K56EV Plus

Personal Computer World Recommended

It'll end in tears... and it did, in this case, as we were forced to hand this splendid modem back.

This smart little K56Flex modem added a touch of class to the desk and looked so good, we didn't want to give it up at the end of the test. A row of easy-to-read acronyms on the fascia, illuminated by a series of LEDs, indicated the unit's status and it connected to our ISP at 56Kbps on the first attempt.

Installation was a breeze. After plugging it into the COM port using the bundled serial cable and, if necessary, the 25-pin to 9-pin adapter that was included in the box, Windows 95 recognised the addition of the new hardware and, following the clear Quick Start Guide that served as the only printed documentation, we set it up as a 28.8Kbps modem. Although this seemed a strange choice, the guide ensured us it would impair neither speed nor performance.

The now almost ubiquitous SuperVoice 2.2 software was included in the package, allowing us to carry out a number of fax, voice and data operations including setting up our own "fax on demand" service to allow callers to request documents from our PC. The SuperVoice installation disk also held a comprehensive set of generic modem instruction manuals which, although not tailored directly to this particular modem, gave good background information on the basic operation and workings of modems in general.

While a headphone set with built-in microphone arm allowed us to use the modem as a hands-free telephone, the option to add a microphone and speakers turned it into a full-duplex speakerphone. The advantage of full duplex is that it does not impede natural conversation in the way that half-duplex does, because it does not mute one side of the conversation each time the other caller is talking. This modem is also optimised for AudioSpan Simultaneous Voice and Data (SVD) operation, allowing data and voice to be transmitted simultaneously. In this way, two SVD-compliant modem owners playing an online game can shout insults to each other, or in a business situation, clients can upload files while talking the recipient through the content.

Nik Rawlinson

PCW Details

Price £119.95 (£102.09 ex VAT)

Contact Direct Source 0118 981 9960 www.btwebworld.com/tmd/

Good Points Small. Attractive. Feature-packed.

Bad Points We had to give it back when we had finished this review.

Conclusion We loved it.

★★★★★

p82 ➢

Hardware

Toshiba Libretto 100CT

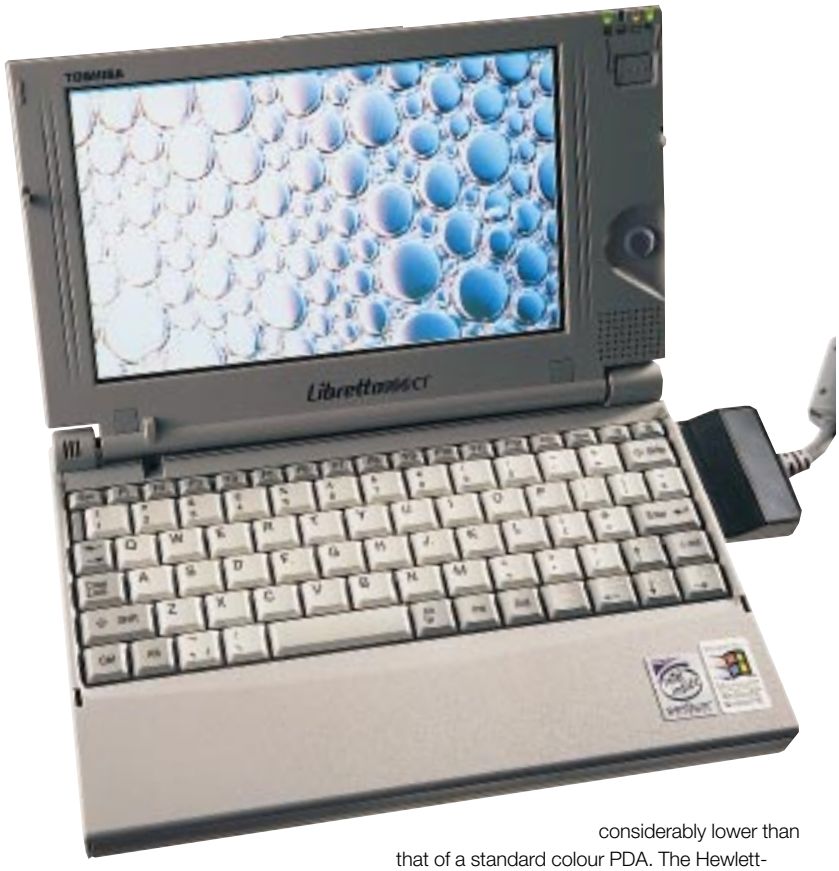
A full version of Windows 95 and true portability are the key elements of this mini-notebook.

A bewildering array of choices now face any prospective buyer of a portable computer. Do you start at the bottom of the tree with a PalmPilot, do you buy a PDA and if so, do you go for CE2 or a non-Windows platform? Do you do for a thin and light notebook, or one with all the bells and whistles you expect to find on a desktop, but in an 8lb package?

To add to the confusion, there are now an increasing number of very small notebooks, not much bigger than the larger PDAs but which run a full version of Windows 95. The best known of these is the Toshiba Libretto, now in its third and most powerful configuration. The obvious advantage of a full notebook in a small form factor is that you do not have to sacrifice any of the applications you normally run on your desktop for cut-down versions on your PDA, and file swapping is easy while portability is not an issue.

With many applications — especially office applications — needing increasing amounts of processing power and RAM, Toshiba has equipped the Libretto 100CT with a P166MMX processor and 32Mb RAM, expandable to 64Mb; the next Libretto down, the 70CT, has a P120 with 16Mb RAM. The 7.1in TFT display is longer and thinner than conventional screens, running at the unusual resolution of 800 x 480 in 16 million colours. You can drive an external screen at 1024 x 768 in thousands of colours in virtual mode.

The notebook itself is very small, measuring just 8.3in x 5.2in x 1.4in, and reasonably simple, with just a 2Gb hard disk, two Type II PC Card slots, microphone and headphone jacks, and a Fast IrDA port (4Mbits/sec). For more conventional file transfer an external floppy disk drive is supplied, in this version connected via a PC Card rather than through a proprietary port. This connection can be hot-swapped, but it is quite bulky to carry around.



Thumbs up

The pointing device is a strange thing. It is similar to the stick devices found on Toshiba and IBM notebooks, but instead of nestling in the middle of the keyboard, it is up beside of the screen. It is also larger than stick devices, being almost a centimetre across, but uses the same Velcro-like material on it. The buttons are on the lid, so you put your index and second finger on these and use the stick with your thumb. This does take some getting used to, especially as your whole hand is in a totally new position.

The port replicator comes as standard with the 100CT (it was optional on earlier models) and has the usual parallel, serial, VGA and PS/2 ports. If you want network support, you will still have to use a PC Card network card.

The keyboard is extremely squashed. It will drive touch-typist's berserk, and you will have to resort to the two-fingered approach to make any headway. In feel and size, the keys are very much like those on a PDA; and if you have used a PDA and been happy to take notes on it, then this keyboard won't bother you. If you are trading down from a full-size notebook, you will have more trouble adapting.

Which brings us round to the trade-offs this Libretto requires. It is not a full notebook and so to load software you will either have to use LapLink or get your IS department to load it up over the network. In this respect, it is only moderately easier to use than a PDA.

Not your type

If you need to type on it, it might be more comfortable to use a full notebook. So the question then becomes, why do you need full versions of your Windows 95 apps on a notebook this size? Obviously, if you use non-standard applications written in-house, then this notebook is very useful. But if you are only using Word and Excel and accessing your email, do you really need full versions or can you make do with the cut-down CE versions?

The battery life of the Libretto is also considerably lower than that of a standard colour PDA. The Hewlett-Packard 620LX has a battery life of around six hours, while the Libretto lasts between 2.5 and 3.5 hours depending on use.

Windows CE2 has muddied the waters considerably for those trying to decide between a PDA or an ultra-portable notebook. At more than twice the price of a colour CE2 notebook such as the HP 620LX, any buyer has to ask themselves serious questions about whether the advantages of being able to run a full version of Windows is worth the extra expense. If it is, then the Libretto fits the bill, being both well speced and well built.

Adele Dyer

PCW Details

Price £1,756.63 (1,495 ex VAT)

Contact Toshiba 01932 828828
www.toshiba.com

Good Points Extremely cute. Full Windows 95.

Bad Points Expensive if you can make do with a PDA.

Conclusion If you need Windows 95 in a small package, then this is an excellent buy. If you can make do with a larger notebook or the more limited functionality of a PDA, then save your pennies.

★★★★☆

p85 ➢

Hardware

Viewsonic GS771

The short-depth design of this 17th monitor will leave room on your desk for more accessories.

While it would be nice to get one of those lovely, slim, flat-panel displays on our desks, most of us have the sort of budget that will buy a hefty cathode ray tube monitor (the CRT is the bit sticking out of the back of your monitor or television). Now Viewsonic has come up with an answer to your space-saving needs. Its latest 17in monitor, the GS771, has been squeezed into a much smaller area thanks to the use of a short-depth design. This simply means that the monitor's inner, glass CRT tube has been shortened, reducing the footprint of the monitor and thus the amount of desk space that it will take up.

The GS771 has a 16in viewable diagonal and measures just 410 x 416 x 485mm (WxHxD), a footprint which Viewsonic claims is comparable to a 14in monitor. It produced a good image too, which is just as well because it is being promoted for use with graphics applications such as desktop publishing and presentation design. Focus was exceptionally sharp in all but the very top left-hand corner.

Controls are accessed using a combination of four unobtrusive buttons located at the bottom of the screen. There seems to be a trend away from having dedicated controls for brightness and contrast, and the GS771 follows it. As well as sizing and positioning controls, the on-screen display contains adjustments for vertical pincushion, side pincushion, tilt and manual degauss.

We liked the Viewmatch Color, which allows you to adjust the colour temperature of the monitor as well as individual colour intensity. Getting the monitor to swivel on its pedestal proved to be a bit of a chore, as it was rather stiff and required a bit of force.

The GS771 manages a non-interlaced resolution of 1024 x 768 at a rock steady 87Hz, and is both TCO 95 and EPA Energy Star compliant.

Lynley Oram

PCW Contact

Price £386.58 (£329 ex VAT)

Contact Viewsonic 0800 833648
www.viewsonic.com

Good Points Small size. Reasonably priced.

Bad Points Only the stiff pedestal.

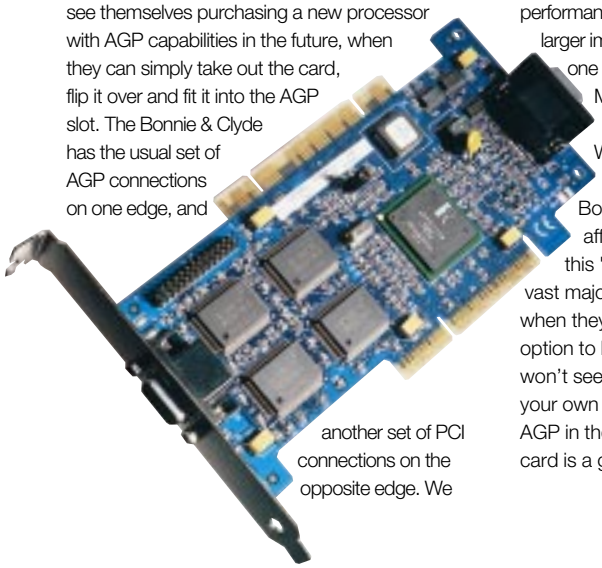
Conclusion Good value for money, but shop around before buying.

★★★☆☆

Outlaw 3D Bonnie & Clyde

An innovative way to future-proof your machine, with PCI/AGP and a price that's a real steal.

The Outlaw 3D Bonnie & Clyde is the first graphics card with both PCI & AGP connections, using the same Rendition V2200 chipset as the Outlaw 3D card released at the end of February. With the increasing prominence of AGP, Jazz seems to be targeting users who want to replace an older PCI card but see themselves purchasing a new processor with AGP capabilities in the future, when they can simply take out the card, flip it over and fit it into the AGP slot. The Bonnie & Clyde has the usual set of AGP connections on one edge, and another set of PCI connections on the opposite edge. We tried it as a PCI card first, and ran the 3D Final Reality test: we were impressed by the results, bearing comparison with the ATI Rage Pro card. (The tests were run on a PC with PII 266 processor and 64Mb RAM.) Switching it over simply meant shutting down the PC and reversing the back plate to fit it into the AGP slot. There were slight improvements in overall performance when we used it as an AGP card, and larger improvements in the bus transfer rate, as one would expect (from 2.12 to 2.98 Reality Marks). However, overall, it scored less impressively than the ATI AGP All-in-Wonder card we tested it against.



Jazz claims the advantage of the Bonnie & Clyde is that consumers can buy affordable future-proof peace of mind with this "complete graphics" solution. But the vast majority of users buy complete PC systems when they choose to upgrade, and as such, the option to keep hold of their old graphics cards won't seem too appealing. If you enjoy building your own PC and are keen to take advantage of AGP in the future, then this best-of-both-worlds card is a good investment.

Paul Trueman

PCW Details

Price Outlaw 3D Bonnie & Clyde 4Mb, £128.08 (£109 ex VAT). 8Mb, £175.08 (£149 ex VAT)

Contact Jazz Multimedia 0181 561 4441
www.jazzmm.com

System Requirements Windows 95.

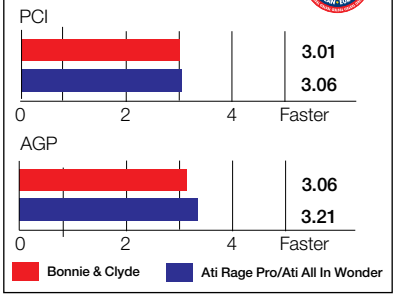
Good Points A cheap way to future-proof your PC.

Bad Points Not a stunning performer.

Conclusion A cheap, innovative alternative for DIYers.

★★★☆☆

Performance results



p87 ➢

Hardware

Sharp HC-4500 and CE- AG04

Sharp's colour palmtop has an optional digital camera. It's a nice idea, but it's not cheap.

The Sharp HC-4500 is the second colour palmtop to arrive in the United Kingdom. From the outside, it looks almost identical to the monochrome Sharp HC-4100A we reviewed last month; a quick glance over the physical specifications confirms this impression.

At 495g, the HC-4500 is only 85g heavier than its monochrome stablemate. And with dimensions of 186 x 96.5 x 29.6mm, it is a mere 3mm deeper and 3.2mm higher. The sleek design is the same, with a good-looking two-tone cover giving the impression of a seriously slim machine.

The case incorporates three buttons on the side for turning the alarm off, opening the machine lid and recording a voice memo via the built-in microphone. The keyboard is exactly the same: surprisingly spacious and remarkably easy to type on.

European union? Not this time

The internal specifications of the two machines are very similar. Both use a MIPS 32-bit processor and incorporate a Type 1 PC Card slot, an infra-red port (compatible with any devices supporting the IrDA standard), a serial port (for connecting to your PC, the cable is supplied) and a speaker.

The US versions of both the HC-4100 and the HC-4500 come with a built-in 33.6kbps software modem, but neither European model is shipping with this feature. Sharp would have to get approval from the telecommunications authorities in each country it is selling to, and because of the time and cost involved, it is not prepared to go through these processes.

Screen and battery — and a curious beast

The HC-4500 makes two main improvements over the HC-4100: 16Mb of memory, compared to 8Mb, and the 6.5in diagonal, 640 x 240 resolution colour screen. The screen is terrific, with a bright backlight that can be turned off at any time, and well-balanced colours. Battery life is claimed to be six hours of continuous use, but as the rechargeable battery pack is not lithium ion, memory effects can diminish the battery life over time, even though you fully discharge the unit.

The optional CE-AG04 digital camera is a curious beast.

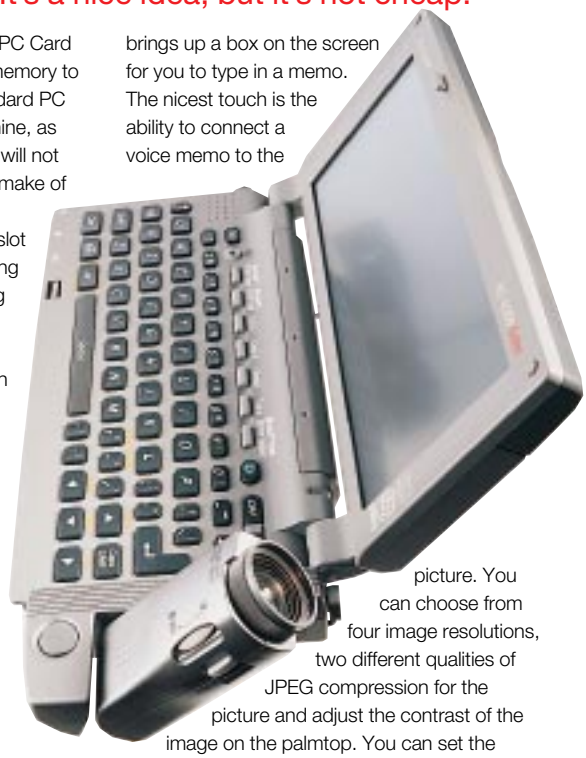
Fixed on to a PC Card, it slots into the PC Card slot on a Sharp palmtop and uses its memory to store pictures. As it is based on a standard PC Card, it should work with any CE machine, as they all have PC Card slots. But Sharp will not guarantee compatibility with any other make of palmtop because of physical problems with case designs where the PC Card slot is recessed. This prevents the card being pushed all the way into the slot, making connection impossible.

The camera card has a maximum resolution of 640 x 480 with 16.7 million colours. This kind of quality is fine for small printed images or putting pictures on to electronic documents and web pages, but is not really good enough for large (normal photograph size) prints. There is a 2x optical zoom facility which is managed using a dial on the camera itself, and a further 2x digital zoom using the palmtop. The macro mode can take pictures of objects as close as 6.5cm and the aperture can be set to F2.4 or F8.

Solid state

For a digital camera mounted on the end of a card, it is remarkably steady and solid. The actual camera can swivel around 180° up or down, so you can put the palmtop down on a table and point the camera upwards to capture an image. This raises an important point: we found the combination of palmtop and camera to be much harder to keep steady when compared to a normal digital camera. Admittedly, the card camera is a lot lighter than normal digital cameras, but you are forced to take along the palmtop even if you just want to use the camera.

The camera is extremely easy to use. Switch the palmtop off, insert the camera card and turn on. Double-tapping on the Camera icon opens the digital camera application and automatically begins showing the camera's field of view on the palmtop's screen. Pressing the button on the camera takes a picture and brings up a box on the screen for you to type in a memo. The nicest touch is the ability to connect a voice memo to the picture. You can choose from four image resolutions, two different qualities of JPEG compression for the picture and adjust the contrast of the image on the palmtop. You can set the camera to capture four or sixteen lower-resolution images which, in total, take up the same space as one normal photograph.



At present, you cannot save money by buying the palmtop and the camera at the same time. However, if you want both, it is likely that some dealers will do a bundling deal for the pair.

Adam Evans

PCW Details

Palmtop
Price £799 (£680 ex VAT)

Contact Sharp 0800 262958
www.sharp-uk.co.uk

Good Points Great screen. One of the better palmtop keyboards

Bad Points Rechargeable batteries are not lithium ion. The software modem is missing.

Conclusion A lovely bit of kit, but it's not cheap.

★★★★☆

Camera
Price £349.99 (£297.87 ex VAT)

Contact Sharp 0800 262958
www.sharp-uk.co.uk

Good Points Small and light. You get instant access to photographs on the palmtop.

Bad Points Only guaranteed to work on Sharp palmtops, and you have to use it in conjunction with the palmtop.

Conclusion A lovely idea, but the price is prohibitive.

★★★☆☆

p90 ➢

Hardware

LG Electronics Art Shot

Snap your friends in style with this impressive digital camera whose flash packs quite a punch.

The Art Shot is LG Electronics' first foray into the world of digital cameras. The company has stuck to a general design that has been tried and trusted by a number of other manufacturers in the last few years, although it has managed to imbue the Art Shot with a certain amount of style. The operation of the camera is based entirely on the power-hungry LCD panel. You use it both to take pictures and look at them afterwards, unlike many of the more expensive digital cameras which use a normal viewfinder for snapping the shots.

On the positive side, the LG camera does have a number of features to recommend it. There is a pop-up flash and a self-timer, for those group shots that you really have to appear in. The LCD-based menu system is easy to use and allows you to view pictures singly or in groups of nine, from which you can then go to a particular shot. Deleting pictures is also reassuringly simple. The LCD section can be swivelled through 180°, letting you see yourself on the screen. There is a handy contrast control on the bottom of the panel for adjusting the display.

The Art Shot has 4Mb of internal memory and uses JPEG compression. There are two resolutions, Fine (640 x 480) and Normal (320 x 240). 124 pictures can be stored at one time if they are in Normal resolution, while 62 Fine pictures can be held. The lens is a 6mm fixed focus at F2.4 that can focus on objects as near as 60cms away. We found the flash to be quite strong, and although it is recommended for subjects as close as one metre, this is a little too close in reality.

The Art Shot is supplied with four AA batteries, a soft carrying case and a wrist strap. It can be powered by a 6v mains adapter but this is not included. Connecting the camera to our PC was extremely easy and the software made playing around with the pictures an absolute doddle.

Adam Evans

PCW Details

Price £299 (£254.47 ex VAT)

Contact LG Electronics 01753 500400 www.lg.co.kr

Good Points Stylish and easy to use. Easy connection to PC.

Bad Points No mains adapter. No viewfinder.

Conclusion Definitely a contender in this price bracket.

★★★★☆

Storm TotalScan

A decent enough scanner, but you'll have to be patient waiting for results — it's *very* slow.

Storm's TotalScan is aimed at SoHo and home consumers. Installing the initial software is simple, and the drivers are loaded automatically. There is no mention of the TWAIN drivers in the accompanying manual; it is all done for you. The basic package consists of three applications: EasyPhoto, Adobe PhotoDeluxe 2.0 and the Xerox Pagis SE document suite, with an extra CD of four "fun" applications. Using EasyPhoto was straightforward enough, but the other two applications required the BIOS settings for the parallel port to be set to "Bi-directional", of which there was no mention in the user guide.

Both EasyPhoto and PhotoDeluxe had an infuriating default setting that automatically saved colour and greyscale scans as JPEGs and line-art scans as bitmaps. Between them, the three applications offer only three file formats to save to: Xerox's own XIF, JPEG and bitmap. It seemed slightly ludicrous that the software didn't at least give you the option to save in a more expansive file format, and it wasn't even mentioned in the manual. We managed to import the scans directly into Adobe Photoshop 4 and save them as TIFs.

We were disappointed by the scanning times we recorded: an A4 letter line-art scan at 100dpi took 1 minute 5 seconds previewing, and 1 minute 50 seconds for the scan. When we ramped the resolution up to 600dpi, the preview time remained the same, but it then took 6 minutes 50 seconds to scan-in the image. The times recorded for colour scans were even slower, with the maximum interpolated 9600dpi scan taking an astonishing 12 minutes. Although these times are dependent on the PC used, different scanners had been used with the review PC before and scanned similar documents in under a minute.

The quality of the total scan was more impressive, though. We used a standard Agfa scanning target to measure the scanner's colour recognition, and the scanner recognised an impressive 20 out of 22 possible shades of grey and suffered only eight percent loss of colour recognition.

Paul Trueman

PCW Details

Price £149 (£126.81 ex VAT; street)

Contact Storm 0800 838437

System Requirements Windows 95 or NT 4.0.

Good Points An affordable scanner with loads of applications.

Bad Points Very limited choice of file formats with the bundled software.

Conclusion Decent scan quality, shame about the slow performance.

★★☆☆☆

Hardware

Kodak DC200

Personal Computer World Recommended

Megapixel magic, balanced exposure and red-eye-free flashing for the digitally uninitiated.

The Kodak DC200 uses megapixel technology, providing three quality settings up to a maximum resolution of 1,152 x 864 in 24-bit colour, which makes your photos more than suitable for output as 5in x 7in prints. With white-balanced exposure and a focus-free lens, this camera is great for the uninitiated. Its fill-in flash incorporates red-eye reduction to save you having to touch-up your results later. The ten-second self-timer is great for group photos.

Images are stored on a removable card, a 4Mb version of which is bundled and holds a maximum of 60 photos at VGA resolution (13 at 1,152 x 864). Additional cards can be bought in capacities up to a maximum of 20Mb (300 images). As well as downloading them onto your PC, a video-out socket will allow you to display them on your TV.

The good looks of this smart little camera are not broken by an intrusive lens cover. We were a little worried, though, by the amount of dust and fingerprints that it inevitably attracted.

The viewfinder is supplemented by a colour display which, after a picture has been taken, shows the image for a couple of seconds only, before switching off. This meant that throughout the whole of our tests we never had to change the batteries once (a major improvement on some of this model's competitors).

Using the bundled Picture Easy Software is a breeze, allowing you to grab pictures from a multitude of sources, including TWAIN devices, CD-ROMs, PhotoCDs and, of course, the camera. Thumbnails of the camera's pictures are reproduced on-screen as slides which can then be printed, edited or filed in an album so that photos on a similar subject are stored together. The process is slowed slightly by the fact that every time you delete a photo it must reload every thumbnail.

To share your masterpieces with friends, the camera can send them as postcards via CompuServe, Eudora, AOL and a selection of other protocols. A freeware viewer allows recipients to look at them.

Nik Rawlinson

PCW Details

Price £527.58 (£449 ex VAT)
Contact Kodak 0800 281487 www.kodak.com
Good Points Megapixel resolution at a far from mega price.
Bad Points No lens cover.
Conclusion Hard to beat.
★★★★★

Canon CanoScan 300S

Off the wall?… On the wall?… wherever you like. A simple, space-saving document scanner.

This document scanner links to your parallel port with a pass-through connector and is small enough to fit between your screen and keyboard. This is facilitated by the curved paper path option, although the standard straight path is more suitable for use where space is not an issue.

Unique to this model is its ability to be fixed to the wall for factory or workshop use; it is just 70mm deep.

The software, CanoWatcher, makes itself resident in your system tray enabling you to scan with just a quick press of the scanner's single button. Scanning an 8in x 5.5in photo at 300dpi took only 4mins 50secs in "true colour". Reducing the resolution to 75dpi presented us with our completed image in under 30secs. Results were slightly washed out and dull and the images lacked depth. But the quality of the 300dpi scan was excellent.

CanoCraft S, the scanning software that pops up when selecting a TWAIN device from your standard graphics software, includes options to fax your scanned image using your default Windows fax printer. Ten preset document sizes are supplemented by a custom option where you can define the size of your document.

The software allows for basic picture editing along the lines of posterisation, softening and colour adjustments. The optical resolution of 300 x 600dpi can be increased to 1,200dpi. Standard settings scan at levels appropriate for output on a wide range of Canon inkjet printers.

CanoBureau works in a similar way as the software supplied with a Visioneer PaperPort. Scanned documents are displayed in a virtual workspace, to be dragged and dropped into applications as necessary. Dropping scanned text into a word-based application will first run the document through the bundled OmniPage Limited Edition OCR software. Simply scanning text alone was disappointing. The text setting on CanoCraft turned our crisp, fine, dark characters into slightly bloated and rather greyed facsimilies of their original form.

Nik Rawlinson

PCW Details

Price £233.83 (£199 ex VAT)
Contact Canon 0121 666 6262 www.canon.co.uk
Good Points Small, quick and easy to use.
Bad Points Disappointing text scanning.
Conclusion Worth consideration.
★★★☆☆

Hardware

Sharp MC-G1

Keep in touch with everyone, everywhere, with Sharp's latest personal communicator.

In his latest Dilbert book, Scott Adams writes: "I don't want new ways to communicate with people. I want new ways to stop people who are trying to communicate with me."

Wise words, but no-one's listening, and Sharp's latest handheld gizmo makes it even harder to avoid contact with the outside world.

Essentially, the MC-G1 is an integrated GSM mobile phone and electronic organiser. The unit is bigger than most modern mobiles but not much heavier. It also mimics their design with a pull-out aerial, a speaker and a microphone in the usual places, and two buttons for starting and terminating calls. The similarity ends there though, for rather than a numeric keypad, the MC-G1 has a large LCD panel. Flip open the transparent protective cover, press the power button and you're greeted by an on-screen keypad that can be used to dial a number in the usual way.

The crisp, clear, backlit screen works with fingertips as well as the supplied stylus, but apparently will not respond to the pressure of a warm cheek when the phone is in use.

The MC-G1's other features are accessed by strips of icons that run along the top and bottom of the screen. The Schedule tracks appointments and has day, week, month and year views but oddly, no alarm. The Contact list can group entries into several categories, including one that stores the contents of the SIM card.

There's a scribble pad for quick jottings, but no other means of taking notes. This is actually not a bad thing, as all text is input using an on-screen Qwerty keyboard and it can be tedious to enter too much information with its tiny keys.

What is most interesting about the MC-G1 is its ability to send and receive email via any POP3 mailbox. Several service providers can be configured and once a message has been composed, tapping the Send button gets it on its way. Receiving email is just as straightforward but there is no way to ignore attachments. Since the MC-G1 can't decode them, downloading them with message bodies is a slow, costly and unnecessary business.

Julian Prokaza

PCW Details

Price Around £300, depending on airtime agreement.

Contact Sharp 0800 262958 www.sharp-uk.co.uk

Good Points Email and SMS features. Compact design.

Bad Points Not as versatile as a separate PDA and GSM phone.

Conclusion If you need email on the move, then the MC-G1 fits the bill admirably. But if size is not important, the Nokia 9000 has more features.

★★★☆☆

Black Widow 4830

Personal Computer World Recommended

For decent-quality scanning, this neat little flatbed scanner won't flatten your bank balance.

Flatbed scanners used to be bulky, ugly devices that cost a fortune and could only be afforded by graphics professionals. Well, as with every other PC peripheral, that has changed dramatically. The 4830 Pro certainly is neither bulky nor particularly ugly, and at under £50 before the taxman takes his cut, it is exceptionally cheap.

At this price, you'd expect Devcom to have taken a few shortcuts, yet none of them seem to be serious. The 4830 Pro has a smallish scan area just long enough for A4, or wide enough for letter paper and uses a parallel interface. It is keen on having a fast EPP-enabled parallel port but even using the slower SPP standard we found scanning was quick enough, except for intensive use.

The scanner is TWAIN compliant so it should talk to all major image-editing applications without much difficulty. The driver is easy to install and use, and although it doesn't have sophisticated tools to tweak the scan, we didn't feel the lack of them. You can preview the image and set the area to be scanned, then choose line-art, 10-bit greyscale or 30-bit colour scans and set basic colour filters.

Resolution is adjustable by slider bars (300 x 600dpi optical, up to 4,800dpi interpolated), and it's possible to scan direct to printer, fax or email as well as to file or into an application. Useful maybe, but the heart of a scanner is decent image quality. Here, the 4830 Pro isn't perfect but it certainly equals many more expensive devices. Colour photos look good on-screen and our test scans showed little evidence of clipping. Colour convergence is fair. Line-art scans are a little blocky, but then it is a cheap scanner. OCR shouldn't be badly affected by this, but it's interesting to note that interpolation made little difference to image quality.

The software bundle alone almost justifies the price. Textbridge, even in the cut-down OEM version here, is a competent OCR package, and Adobe PhotoDeluxe 1.0 provides good enough image editing to get you started.

John Sabine

PCW Details

Price £57.58 (£49 ex VAT)

Contact Devcom International 01324 825999 www.blackwidow.co.uk

Good Points The cheapest flatbed scanner we've seen.

Bad Points Blocky line-art scans.

Conclusion For a decent-quality flatbed, the 4830 Pro is scandalously cheap.

★★★★★

p94 ➢

Software

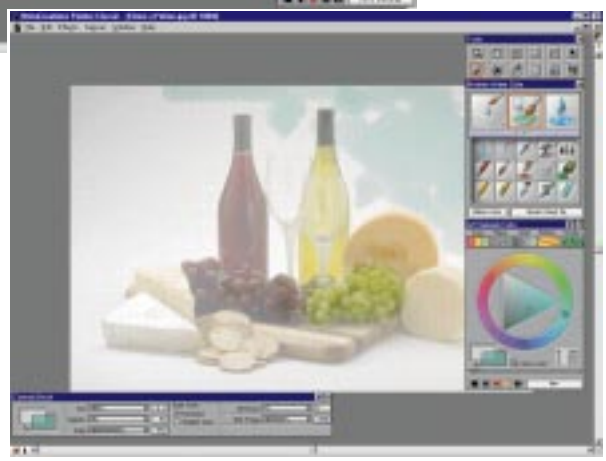
Metacreations Painter

Daub, spatter and splash… Free-range painting-style images and effects for budding artists.

Painter Classic is a light version of Metacreation's Painter 5 Natural Media paint application. It focuses on producing natural-looking results, using tools that mimic real painting media. So central is the idea of "natural media" to Painter, that Metacreations has trademarked the term. Another trademark feature of Metacreations' products is that its interfaces tend to be well designed and Painter Classic is no exception. There are five palettes for access to nearly everything you need.

The tools palette has the usual selection of magnifier, grabber, rotate, crop, brush, paint bucket, and text and selection tools. The brushes palette displays three brushes at the top, with a drawer giving access to 25 further options below. Selecting one of the brushes from the drawer displays it as one of the three "top drawer" options, so you can always have your three favourite brushes to hand. Brushes can also be selected from a pull-down menu and another displays a list of variants which alter the way the brush behaves.

Left You can use Painter Classic's cloning brush to combine two images



Below Painter Classic's clone feature provides one of the best ways of creating new artwork by tracing off originals

Brushes and palettes

Brush variants include big dry ink, big wet ink, big wet oils and big coarse hair. Watercolour variants include small wet, broad chisel tip, wet diffusion and spatter. This tool variant combination approach makes it possible to easily achieve many different effects. There are additional tool libraries on the CD which, although they wouldn't display properly in the drawer, worked perfectly well. (The display problems might have been due to shortage of hard disk space. As with any image editing software, it pays to have plenty of disk space and RAM available to avoid these sorts of glitches.)

The art materials palette provides access to five different media palettes: colour, paper, gradient, patterns and nozzles. The colour palette takes a novel approach to selecting colour that is easy to understand and use. A ring displays all the available hues and a triangle in the centre displays the available colours within that hue. Saturation increases across the triangle in one direction and lightness in the other. Like all good visual tools, it sounds more complicated than it is. There is also an eye-dropper tool you can use to sample colour.

"Paper" textures react to the Painter Classic's brushes in a similar way to real surfaces. Not all textures are paper: a typical selection includes silk, pavement and eggscape, and there are additional paper libraries on the CD.

Nozzles work with the image hose. These days, many paint packages have image hoses but Painter was one of the first and remains the best. The image hose paints with images, not just one but many, changing them at random or according to some other criteria such as pressure or brush direction. Though you can't change these directly, you can choose from 19 variants and there are more nozzle libraries on the CD. As with the other brushes you can change the size, opacity and graininess of the image hose by using the sliders in the control panel.

Source material

If you want to create artwork from scratch, or use photographic or other illustrative material as a source, Painter Classic is ideal. By cloning and tracing, you can use the natural media tools to create paintings from photographic originals.

Tracing paper mode lets you view the original at 50 percent opacity and, by selecting clone colour on the colours palette, your brush automatically picks up the colour of the underlying original so you can either start with a blank canvas and trace, or modify the existing pixels using some of the effects brushes. It is like using filters, which gives you far more control over how and where, and how much, you apply a particular effect.

No limit to the ambitious

Despite the fact that it is missing some of its heavyweight stablemate's more advanced features (such as multiple floating layers, dynamic plug-in floaters, a mosaic tool, or colour management) Painter Classic is not lacking and will not limit the ambitious.

The simpler, redesigned, interface makes the available tools and features more accessible than they would otherwise be to a novice working with Painter 5. Additionally, there is a fully-featured Scripting palette and a seamless tiling feature for web designers. If you do outgrow it, you can upgrade to Painter 5 for £149 (ex VAT). This is an excellent offer when you consider that the combined cost of Classic and the upgrade is actually £10 less that the price of Painter 5 alone.

Ken McMahon

PCW Details

Price £104.58 (£89 ex VAT). Upgrade to Painter 5 £175.08 (£149 ex VAT)

Contact Computers Unlimited 0181 358 5857 www.metacreations.com

System Requirements Windows 95 or NT.

Good Points Great natural media paint tools. Easy-to-use interface. Retains the best bits of Painter 5.

Bad Points Shame about the missing mosaic tool. Better selection tools, including a magic wand, would have been good.

Conclusion For beginners who want to create painting-style images and effects, there's no better introduction.

★★★★☆

p99 ➢

Software

MS Visual J++ 6.0 BETA

Jokers wild! This is Java development the Microsoft way and it is 100 percent pure Windows.

This is a strange product to assess because it is a Java development tool, and Java is the property of Sun Microsystems. And yet Visual J++ goes exactly against Sun's "write once, run anywhere" vision.

Visual J++ is positioned primarily as a Windows development tool, where it sits alongside Visual C++ and Visual Basic. The technology behind it is J/Direct, a feature of Microsoft's JVM (Java Virtual Machine) which lets you make direct calls to the Windows API, or indeed functions in any DLL (Dynamic Link Library). J/Direct opens up all the features of Windows to Java, the downside being that cross-platform compatibility is lost. Visual J++ 6.0 introduces a new component library based on J/Direct and integrated into a visual development environment similar to Visual Basic. The language may be Java, but the resulting applications are 100 percent Windows.

In the Swing of it

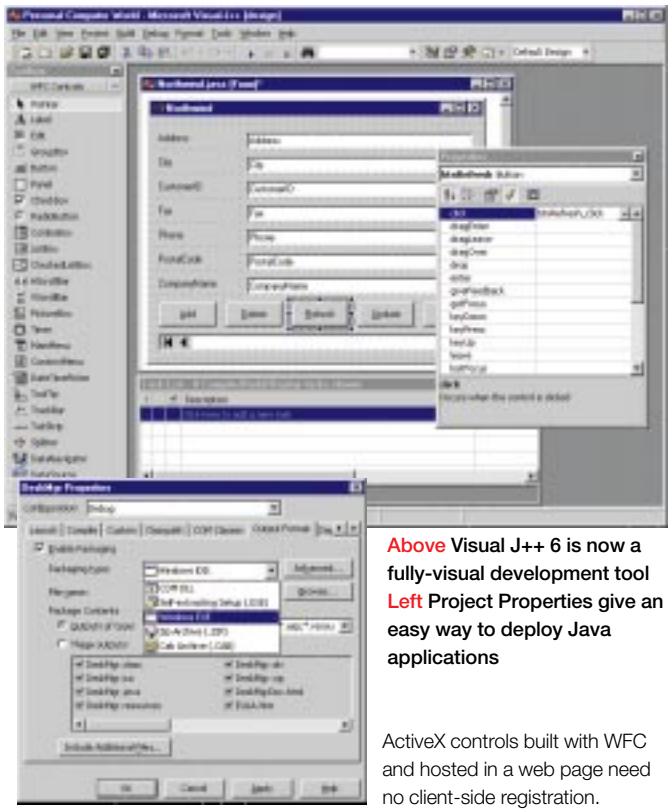
Java is evolving fast. Sun's Java Development Kit (JDK) 1.1 introduced JavaBeans, a native component model for Java which works well with visual design tools such as Symantec's Visual Café or Borland's JBuilder. JDK 1.2, in beta at the time of writing, incorporates Swing, a set of Beans-compliant graphical widgets that give Java an official look-and-feel, along with other features such as drag-and-drop. Every other Java development tool is hastening to add these features, particularly the Swing widgets.

By contrast, Visual J++ 6.0 is a JDK 1.1 tool and its graphical widgets are based on the WFC (Windows Foundation Classes), a new class library built on J/Direct. It is not clear whether Microsoft will ever support versions of the JDK higher than 1.1, or whether Microsoft J++ will follow its own independent path. For those keen to keep up with official Java developments, Visual J++ is not a suitable tool.

That does not mean Visual J++ has nothing to offer. On the contrary, it is the best RAD tool Microsoft has yet devised, improving on Visual Basic. Java is more powerful than Basic and more productive than C++. It is interesting that the chief architect of the WFC is Anders Hejlsberg, known for his role in creating Delphi for his former employer, Borland. The influence shows in features like two-way tools, which let you edit a form visually and see the generated code, without losing the link to visual tools.

WFC is a component-orientated library, and you can create new controls or non-visual components and add them to a repository and to the toolbox. Data binding is supported via ADO (Active Data Objects) and, using the visual environment, it is easy to connect to either an Access database or any ODBC source.

The programming environment is partly built with WFC. It is called the Microsoft Development Environment, and it hosts both Visual J++ and Visual InterDev. Microsoft says it will eventually become the standard Visual Studio environment for all its tools. It follows the style of previous Visual Studio IDEs, but with new features.



Above Visual J++ 6 is now a fully-visual development tool
Left Project Properties give an easy way to deploy Java applications

Taken to Task

The Task List is a convenient tool which shows any errors after a build; double-clicking an error brings up the faulty code. You can also add your own tasks. The Project Explorer shows the contents of a project in file or package view and there is a class outline window that displays class members. This links to a complete object browser, with source code easily displayed where available.

Some features are good enough to tempt Java programmers who may not want to use the WFC or ActiveX. You can build cross-platform Java applications in Visual J++, by avoiding the Windows-specific extensions. Code completion brings up a list of class members as you type, with a tooltip showing comments. For debugging you can select from seven debug windows, such as Watch, Threads and Call Stack views.

A neat feature is cross-process debugging, which lets you step into any Java-based server on the network. Deployment is easy. Deployment targets are set in the Project Properties dialog and include an option for a self-extracting setup executable, along with the usual ZIP and CAB formats. Windows executables use the Microsoft JVM so are not compiled to native code, but performance is good.

Visual J++ includes an HTML editor along with its Java tools. A key feature is that Windows and Dynamic HTML share the same property and event model so you can easily create applications with an HTML interface. You can also use WFC on a server to generate HTML. There are advantages to building your application around a Dynamic HTML front-end, one of which is that ActiveX controls built with WFC and hosted in a web page need no client-side registration.

Winning ways

Despite its peculiarities as a Java product, Visual J++ has the makings of a great visual development tool for Windows. It is a step up from Visual Basic, and much easier to work with than C++ and the Microsoft Foundation Classes. It is also an ideal environment for creating distributed applications using COM, the Microsoft component object model. Finally — and say this in hushed tones — it offers Java programmers a way to create applications with fast, fully-featured graphical interfaces, something that until now Java has not been able to achieve.

Tim Anderson

PCW Details

Price To be announced

Contact Microsoft 0345 002000
www.eu.microsoft.com

System Requirements Windows 95 or NT.

Good Points Great IDE. Better than Visual Basic. Easier than C++.

Bad Points Not cross-platform. Not up to date with Java developments.

Conclusion A joker in the pack — Java for Windows development.

★★★★☆

p100 ➢

Software

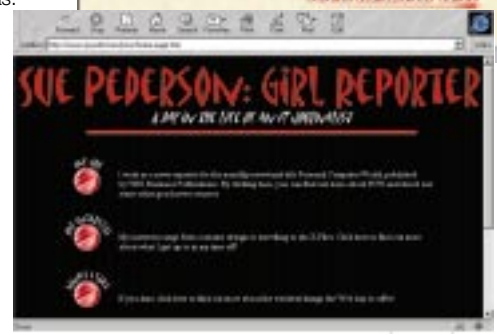
ZY Web

The easy way to set up your own pages on the web — and no experience of HTML required.

The growth of the internet has spawned a whole new breed of products that allow you to get set up on the web. Authoring tools have become extremely popular in the past few years because the user doesn't need to write HTML. They can be expensive for the home or small business user, though, who may be loath to shell out for a too-sophisticated application when all they want is a simple web site.

ZyWeb has come up with a range of products designed to solve just this problem. Its web publishing tools are geared towards people who are neither experts nor dedicated enthusiasts, and what's more you don't have to buy special software. All you need is a web browser and a net connection and you're ready to go. Depending on which product you choose, you are provided with a certain amount of web space, email addresses, style templates, graphics and other little extras.

ZyWeb sounded like a winner and we were eager to test it out. We were set up with ZyWeb Home, which gives you 5Mb web space, an unlimited number of pages, 50 template design styles, 20 3D and 20 2D heading styles, 20 buttons, 20 background styles and 50 fonts. You're given unlimited image upload (as long as you don't exceed your space limit), and Photo Lab, which lets you scale, crop and otherwise edit your pictures. You're also given five email addresses, complete with email redirect.



Above **ZyWeb gives you a wide variety of designs from which to choose, but not all of them may be to your taste**
Left **You can design a page in minutes, but creating one as glam as this will take you a little longer**

Online extravaganza

If you need a few more options, you can also try out ZyWeb Business, which offers you 10Mb of web space and 100 web template design styles. ZyWeb provides customer feedback forms that you can adapt for a number of purposes, ranging from simple customer comments to requests for further information. The Web Stats Package also keeps you up to date with the number and type of visitors to your site. If you've already registered a domain name, ZyWeb will let you keep it and provide you with an extra ten email addresses.

To start, head off to www.zy.com and register directly on the site. Your credit card is billed for one years' service immediately after you register. You are provided with a user name and password, and can then start designing your online extravaganza.

You're given a wide choice of design templates that you can alter to a certain degree. Unfortunately, we did not think much of most of the designs provided. In the end, we picked the one that made the site look least like we were fronting a doomsday cult and then adapted it.

The rest of the design process is rather like filling in the blanks and is quite straightforward. The page is divided into two panes: one where you make your changes and decisions, and another which shows you what your page will look like. Just choose your overall design (font, text colour, background, heading and button styles) and fill in your text.

To see how a change will look, click the Show Me button and the page will update itself to reflect the latest changes. And in case you think that the epitome of style is orange writing on a pink background, ZY.com also provides a cautionary design guide on their site. When you've finished, save the page and hit a button to publish it. You're then given that page's URL and can immediately go and visit it.

Looking good

Couldn't be simpler, right? Well, not quite. Although the process of designing the site is very straightforward, the ZY.com site was extremely sluggish and took a very long time to respond. We spent large chunks of time staring into space while waiting to the page to reload. We also had problems logging on to the site a few times and, at one point, when we typed in www.zy.com, we were taken to the Sun Web Servers page (thankfully, the redirection was only temporary).

The site also requires a large amount of free memory to run properly. It froze up our PC more than a few times. This flakiness may have been due to our PC rather than the site, but fortunately the site always recovered the last version of the page on which we were working, which is one of the benefits of doing all the work online.

In the end, our site looked much better than we thought it would. If you want to try it before you buy it, you should give the free version, ZyWeb Lite a whirl. It gives you a choice of ten template designs, five 3D and five 2D heading styles, six background textures and ten fonts. You can upload four images, and you are given Photo Lab and one email address with re-direct facility.

Susan Pederson

PCW Details

Price ZyWeb Home £48 (£40.86 ex VAT), ZyWeb Business £235 (£200 ex VAT), ZyWeb Lite is free.

Contact ZY.com 01442 350300 www.zy.com

Good Points Quick to learn. The all-in-one package means no hidden extras.

Bad Points The site can be slow. The design templates may not suit your taste.

Conclusion The styles may not be to everyone's taste, but ZyWeb is more flexible than you think and may well suit someone looking for an all-in-one solution.

★★★☆☆

p103 ➢

Software

AutoSketch 5

A new version of AutoSketch with a heavy Drafix flavour that will leave regular users bemused.

The AutoSketch faithful have waited a long time for a new version of this 2D computer aided design (CAD) program. Since there has only been a "point-one" upgrade in the past four years, many might have felt this was the end of the road. Life is full of surprises, though, including this sudden leap from version 2.1 to 5.

One unusual feature of version two was the Tool-Object approach. Instead of selecting an object then applying a tool, you took the tool to the object; there was no selection arrow tool. Although this goes against the established conventions of drawing software, it does have a real-world logic: if you want to erase something, you take the eraser to the line, not vice versa. Version 5 abandons this in favour of the Object-Tool approach seen elsewhere, as part of a "Microsoft Office Compatible" drive.

Snap to it!

Another surprise is the change in object snaps. These let you attach, say, a line to a precise point on another object by snapping magnetically to the end or middle of a line, the centre or quadrant of a circle, and so on. An improvement in version five is that the snap points "light up". In version two, it could be difficult to tell if one was within the catchment area of a snap point. But this version takes the retrograde step of snaps being mutually exclusive, so you can no longer have endpoint and centre snaps active simultaneously.

Furthermore, with a snap mode active you have to use it; you can't place a "free-range" point away from a snap point as you could before. This flexibilty was one of the best features of AutoCad 2 and it's a matter of astonishment that Autodesk has seen fit to "improve" it in this way.

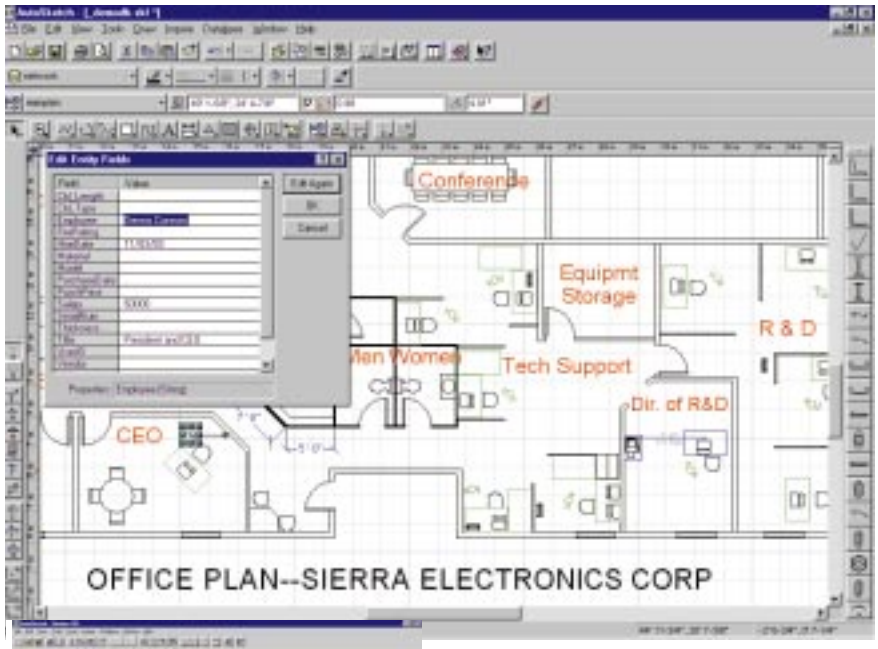
Another casualty is the group command that let you select multiple objects then group them together so they could be moved about as a whole without reselecting each one. However, there are now myriad ways of defining multiple selections using Boolean operators to combine selection by layer, colour or other properties.

Angle on the Edit bar

An Edit bar is another newcomer. If you draw or select a line, for instance, this will show the start and end co-ordinates, length and angle, all of which can be altered from the keyboard. This also lets you edit the centre and radius of circles, but you cannot edit rectangles in this way.

One new feature not directly related to drawing is the facility to attach non-graphic information to an object. You could, say, give an office desk or a kitchen sink a manufacturer and model name, price and other details. All such information in a drawing can then be exported to a database.

This release bills itself as multi-purpose rather than general purpose and to this end there is a set of wizards for creating architectural and mechanical drawings, as well as flow charts, web-site maps and other diagrams. These are of mixed quality. The general Precision Drawing wizard offers a good variety of choice, but the Building wizard doesn't offer a choice of units or scale.



Top Object attributes can be assigned, then exported to a database
Above Not just multiple views on the same drawing, but multiple files open, too

There's a good range of symbol libraries for such things as nuts and bolts or doors and windows, but in the review version these were all in Imperial sizes (Autodesk assures me that the proper UK release has metric libraries).

No 1998 software release would be complete without internet capabilities and Autosketch 5 is no exception. You can attach a URL to any object that will launch the default browser and jump to the site. Links can be made to files on a local disk or network so, for instance, you can click on an object to open an explanatory text file or another drawing.

All in all, there have been widespread and radical changes, both to the interface and the feature list, but there is a very simple explanation. This is not a new version of AutoSketch as we know it. It is based on the "drawing engine" of Drafix CAD, which Autodesk recently acquired. Indeed, examining the Windows Registry shows that the installation adds several "Drafix" entries, including, rather strangely, a "Drafix Macro" filetype. I say "strangely", because the macro facility is yet another casualty of this upgrade.

Dead end

To be fair, this isn't a bad budget CAD program overall, though it does seem rather sloppily put together in places. As it's Autodesk's bat and Autodesk's ball, presumably the company can call the product what it likes. But were I an existing AutoSketch user who had just paid for an upgrade I'd feel angry, insulted and saddened: the first at being misled as to what I was buying, the second at the presumption that I wouldn't know the difference, and the last at realising that the AutoSketch I'd grown used to was now at a developmental dead-end.

Tim Nott

PCW Details

Price £116.33 (£99 ex VAT). Upgrades £57.58 (£49 ex VAT)
Contact Autodesk 01483 303322 www.drafix.com
System Requirements Windows 95 or NT.
Good Points Includes some of the best features of Drafix CAD.
Bad Points Drops many of the best features of AutoSketch 2.1.
Conclusion AutoSketch in name only. Upgraders are in for a shock.
★★☆☆☆☆

p105 ➢

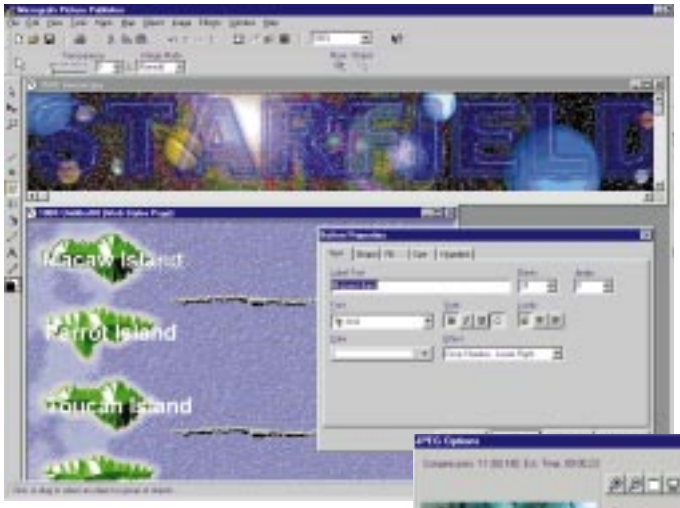
Software

Picture Publisher 8

Serious image processing with some great features, at a price that will make you smile.

The image processing market is highly competitive at all levels, from the high ground of Adobe Photoshop and MacroMedia X-Res, through the middle ground of Paint Shop Pro and mgi PhotoSuite, right down to consumer-orientated products such as Kai's Photo Soap or Microsoft's Picture-It. Despite its sub-£100 price tag, Picture Publisher belongs firmly with the high-enders.

All the professional features you might expect have been available for some time, with layered objects that let you mix images from different sources while keeping them independently editable. It supports Adobe-standard Plug-Ins, will produce spot and process separations, and has full CMYK support. There is a good selection of "natural media" painting and retouching tools, anti-aliased brushes and masks, and support for pressure-sensitive tablets. Sophisticated masking tools include an autotrace feature for finding outlines and a "Colour Shield" to mask up to ten different colour ranges in an image.



Left Using a ready-made Web Style, and above, a banner made using the lens flare, image spray and glass text effects **Below** Advanced save options for web images

GIF and JPG save dialogs let you preview transparency and image quality, and see the estimated download time of an image.

At your Command

Picture Publisher's killer feature, now several versions old but still, as far as I know, unique, is the Command Centre. This keeps a record of every action you perform, as a script. You can save and replay scripts as macros, so for example could carry out the same sequence of actions on a series of photographs.

The real beauty of this, however, is that actions are recorded automatically, so you have an extremely flexible selective undo facility. In a sequence, say, of ten actions, you can remove actions numbers 4, 7 and 8 then rebuild the image just using the remaining actions. Another advantage is since this selective undo is script-based it doesn't hog vast amounts of memory, unlike the traditional undo which keeps multiple copies of the bitmap in memory.

So, having dispensed with the history, let's see what's new. Predictably enough there's web-with-everything. For those who don't want to bother with piecemeal design, there's a range of Web Styles, templates for creating near-instant web pages by clicking on the various buttons, bars and placeholders to add text, effects and links. For more ambitious users there are more tools, including a Bevel Factory for instant button creation. Then there's a Contact Sheet generator for creating thumbnails of images, with URLs automatically attached.

Image map creation lets you assign links to part of an image or object, and there's a whole set of animated GIF tools, including a Wizard for applying pre-set animated effects to text and images. A texture editor means you can create and preview seamless web-page backgrounds, and advanced

Camera Aperture in focus

Moving back to mainstream image-editing, there are a number of new and interesting features. Taking the Camera Aperture feature, this can selectively "unfocus" part of an image. Aim the centre of the aperture, choose the f-stop (higher value means more of the picture is in focus) and the area outside the "depth of focus" area will be blurred. Another feature using the camera model is "lens flare". There are no less than sixteen variables here, all conspiring to give very realistic and arty flare effects, from the number and brightness of rays to the intensity of the anamorphic lighting.

Other effects include a Light Studio which lets you create quasi-3D effects with multiple light sources, and textured "bump" maps. Text is produced as an independent, layered object, so always remains editable — just as in a drawing package — until you save into a non-layered format. Over 400 TrueType fonts are included.

Putty in your hands

For a more fun approach, there's the Warp tool and the Distort filter. The former lets you pull a picture around as if it were made of putty, rather like a more limited version of Kai's Power Goo. The latter is a large range of pre-set options for stretching, twisting or otherwise distorting an image on a grid basis.

On a more serious level there's Kodak colour management for correlating screen, scanner and printer output , and support for the FlashPix multi-resolution file format. Unlike Adobe Photoshop, there are no Pantone or similar colour libraries, but arguably this isn't too much of a disadvantage for an image-editing rather than a page-layout application.

Despite the powerful features, Picture Publisher isn't a difficult application to use. Each tool has a corresponding Ribbon at the top of the screen which changes to show the appropriate options as you work — brush dimensions, text attributes and so on. There are a whole set of Wizards covering everything from text effects to HTML output, and a respectable set of on-line tutorials. It comes with two more CD-ROMs of sample files and clipart, together with the all-important media manager in which to browse them, either from within the program or as a standalone application.

Tim Nott

PCW Details

Price £93.89 (£79.90 ex VAT) estimated street price
Contact Micrografx 01483 747526 www.micrografx.com
System Requirements Windows 95 or NT.
Good Points Powerful but friendly, with a killer selective undo and advanced web support.
Bad Points Not all of the effects can be previewed on the image.
Conclusion Serious image processing at a low price. Excellent value.
★★★★★

p107 ➢

Software

Quicken 98 Deluxe

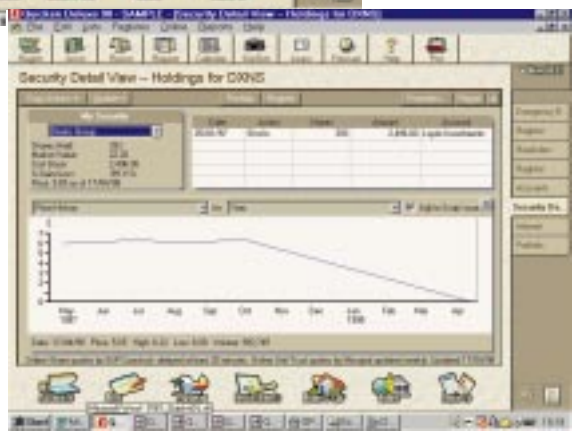
Money matters: integrated invoicing and expanded online facilities mark out the new Quicken.

Quicken is probably the most heavily advertised of all personal accounting software packages. Over the years it has consistently added to its list of features, though some have been more useful than others. The trend continues here with the latest incarnation, version seven, being sold as Quicken Deluxe 98 for Windows.

You'll notice the first change even when Quicken isn't running. Billminder, the pop-up window that nags you about unpaid bills when you switch on, has been extended to remind you about other financial matters, too, including standing orders, insurance and mortgage reviews, credit card limits and imminent bankruptcy (define an overdraft limit or minimum bank balance, and the program notifies you when the critical figure is exceeded).

Quicken will also show the value of your investments, updating prices from the internet. In fact, the net is now thoroughly integrated into Quicken, giving you one-click connection to its UK-dedicated home page.

Supplementing your purely financial information, the new Emergency Records Organiser offers a near-comprehensive repository for all the ancillary facts like contacts, reference numbers, document location and so on, with separate data for each family member. In addition, Quicken's Home Inventory is retained in this edition, allowing you to itemise, categorise and value all your possessions, with optional integration into your Quicken accounts. Still no provision for pictures though.



Left Quicken's main screen, the Register, replicates your bank statement layout and is just as easy to understand. It can show any of your accounts
Below Quicken will track your investment portfolio, showing profit and loss at a glance

Integrated invoices

Previously an add-on, Quicken's Invoice Manager is now fully integrated and supported by appropriate account categories and reports. Described as being for "the private user who has to write bills from time to time" it's perfectly adequate for the small business with modest invoicing and minimal reporting requirements. Sole traders and some partnerships should find it satisfactory.

If you are not self-employed, Quicken can automatically set up your wage or salary entries to allocate deductions like tax, NI and pension contributions. There is also provision to match Quicken's categories to a new Tax Assistant function, but this didn't work in the review software. If this is important to you, make sure you get a returnable guarantee from your retailer.

There are enhancements to Quicken's reports, with an "EasyAnswer" guide to customising each one. As well as the new Net Worth report, Quicken covers home and investment matters, producing the figures for total and analysed income and expenditure, cash flow and budgets. Some reports can be represented graphically, and the new Financial Calendar prints out your monthly payments and receipts in calendar format. Optional reports for businesses include VAT liability.

Other than that, it's more or less Quicken as before. The principal screen is still the "register", although this has been improved by being able to move transactions between accounts easily, and you get the usual personal accounting facilities. Different kinds of transaction can be allocated to separate account categories (petrol, groceries) for recording and analysis.

Net questions and answers

In addition to its Windows Help files, Quicken 98 for Windows introduces new internet-based support, which is essentially answers to frequently-asked questions. If you don't yet have internet access, you can get the same service from Intuit's Fax on Demand service.

But, to ask your own questions you need telephone support and this is where it gets expensive. All support calls, including those related to installation, cost a pound a minute plus VAT (for our trial of the system we listened to a recorded announcement and a minute's worth of engaged tone on the extension line to which we were being switched, before being cut off). If you're a beginner at either accounting or computing, you might easily rack up 20 minutes' support, taking the package's cost to around £70. If you call from outside the UK, you pay £15 (plus VAT) per "incident".

This edition contains extra help in the form of audio clips, which play the first time you enter a screen. There are also video clips (multimedia tutors) that illustrate some procedures — and very useful they look, too. It's unfortunate, then, that they only seem to be accessible as a disparate list not linked to the standard pop-up Help or its Index (where you need to know that they're under "video"). The Help, including that online, plus the manual and the multimedia tutorials, all betray the package's US origins, sometimes confusingly as when referring to a non-existent "home and business icon" or to online banking.

Although this product is packed with features, the rough edges noted give this edition the feel of having been rushed onto the market a little early.

James Taylor

PCW Details

Price £49.95 (£42.51 ex VAT)
Contact Intuit 0800 585058 www.intuit.co.uk
System Requirements Windows 3.11 or higher.
Good Points Ease of use. Internet integration. Invoicing integration. Report customisation.
Bad Points Incomplete Anglicisation and tax routines. Expensive helpline.
Conclusion Well-featured personal finance accounting, let down by unexpectedly rough edges.
★★★☆☆

p108 ➢

Software

Personal Computer World Recommended

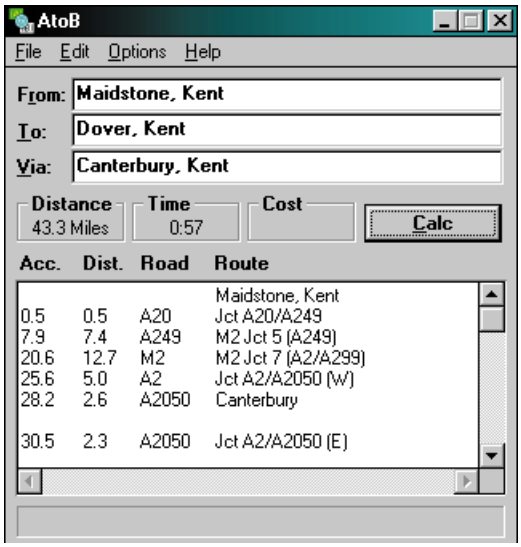
AA Multimedia A to B

It may not provide many alternative, scenic routes, but this basic routefinder will get you there.

Route-planner software can be an expensive investment if all you want is to get the route for an occasional family weekend away or for an infrequent business trip. An alternative is A to B Britain 1998 from the Automobile Association. It is simple to use and makes little demand on system resources. It occupies very little hard-disk space and costs only £15, so it could very well be all you need.

As with all route finders, all you have to do is enter your starting place and your destination and A to B Britain generates the carefully selected AA recommended route. You can also add one location to travel via, such as Maidstone to Dover via Canterbury.

Once you have typed in the name of your departure point and destination, A to B presents you with a list of places, with the best match selected. The list, or gazetteer, includes over 15,000 towns, villages, road junctions, places of interest and even a few pubs, so unless your locations are very small, they are likely to be listed. Simply confirm that the correct places have been located and the program calculates your journey. The route is fairly basic but understandable, which is important as you may be able to give the printout no more than a quick glance as you are driving along.



Very basic routefinding with fairly clear directions

A to B also provides accurate mileage for journeys, gives a rough estimate of the travel time and lets you cost the journey in several ways: fixed base, cost per distance unit or cost per hour.

Overall, this is a neat and impressively simple product. There are no maps, so a road atlas might prove a useful accessory and only one "via" place could prove limiting on a long journey but it takes the pain out of calculating a route and, for the money, it is a worthwhile investment.

Paul Begg

PCW Details

Price £14.99 (£12.76 ex VAT)
Contact Automobile Association 01865 200800 www.theaa.co.uk
System Requirements Windows 3.1, 95 or NT.
Good Points Easy to use. Easy to understand directions.
Bad Points Perhaps a little limiting with only one "via" or stop-off place.
Conclusion Accepting that this is a very basic routefinder, it does the job simply and quickly. The price is excellent, too.
★★★★★

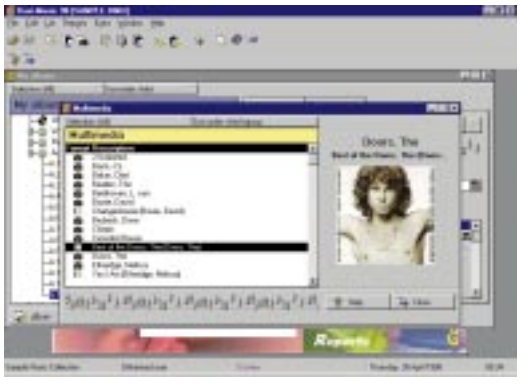
Davilex Davi-Music 98

Lost in music? Then Davi-Music 98 will help you get your CDs sorted in no uncertain terms.

Those who have read Nick Hornby's novel *High Fidelity* will recall that the story was centred around a man who had an unhealthy appetite for basing his life round his record collection.

Some of the trials and tribulations he suffered might have been avoided if he had invested in this piece of software from Davilex, for Davi-Music 98 claims to be as essential a piece of equipment for the record collector as notepad and anorak are for a railway enthusiast.

Davi-Music 98, in its most basic form, is a database tailored for music cataloguing. According to the official blurb, the built-in database contains information on 70,000 CDs. This is principally to save you time when building up your database: if the information on the artist or album is in the Davi-Music database, you won't need to fill in each track and artist details. It is also useful as an encyclopaedia, although when we attempted to create our own database we were disappointed to find several of the well-known artists we chose weren't there — surely Simon and Garfunkel should be among the 70,000?



You can add photographs to your music database

We were also bemused — and amused — by some of the translations from the original Dutch version of the software: apparently we were the "Ortherised User".

As well as cataloguing your CD or vinyl collection you can record clips of each track in one of three quality modes, with the clearest taking up the most hard-disk space. There are many details you can add in, so if you have the inclination there is no reason why you cannot create an incredibly detailed database. There is also the option to update details from the Davilex web site, such as new albums and news stories relating to bands.

If you want to take the obsession with your record collection even further, you can try the report option, which allows you to create mini-reports on such matters as who you have lent CDs to and which essential album is next on your shopping list. Of course, at this point, the men in white jackets will come and take you away.

Jim Haryott

PCW Details

Price £34.95 (£29.75 ex VAT)
Contact Koch Media 01256 707767 www.davilex.com
Good Points Davi-Music 98 is easy to use and will appeal to the person who is serious about cataloguing his or her record collection.
Bad Points There are a few minor glitches, but the main problem is that this software is very time-consuming.
Conclusion Davi-Music 98 is quite a good way to catalogue music, although many of its functions will appeal to hardcore devotees only.
★★★½☆

p110 ➢

Software

Simply 3D 3

Whatever your level of drawing skill, here's 3D animation, stills and thrills to perk up your pics.

At a time when graphics packages are vying to outdo each other in the performance stakes by offering more and more features, it is refreshing to come across one that bills itself as "outrageously easy". Version 3 of Simply 3D builds on its past reputation for quickly creating good-looking 3D animation and stills for the internet, documents and presentations. Micrografx says that mainstream users just want to use something straight out of the box, and Simply 3D 3 fits the bill nicely.

Simply 3D's interface is easy to get a handle on

There has been a large number of improvements made to Simply 3D, not least of which are the Wizards. Even if you don't have a clue about 3D modelling, the Project Wizard will guide you through the creation process quickly and painlessly. The Output Wizard then helps you to decide what kind of format you want the finished product to be; whether it's an animated GIF file for a web page or a PowerPoint presentation. The 2D to 3D Wizard enables you to convert vector illustrations to real-life models in only a few steps.

The user interface remains straightforward, presenting the user with a project window that allows you to manipulate and preview objects while choosing from a variety of camera angles. The scene explorer lists each object in the scene and lets you group and rearrange them as you wish. And the catalog offers thumbnail pictures of nearly 2,000 objects and textures that you can use to get started.

Simply 3D 3 also uses a sophisticated scan-line rendering engine which renders images many times more quickly and accurately, producing smooth and attractive images.

The objects we managed to create with Simply 3D 3 may not win the Turner Prize, but they took very little time and effort, and we were left with the feeling that we were limited more by our creativity than by the package itself. There are undoubtedly other 3D packages out there that would do a more professional job, but if you're in search of an impressive, quick and inexpensive way to jazz up your web page, then you could do a lot worse than try out Simply 3D.

Susan Pederson

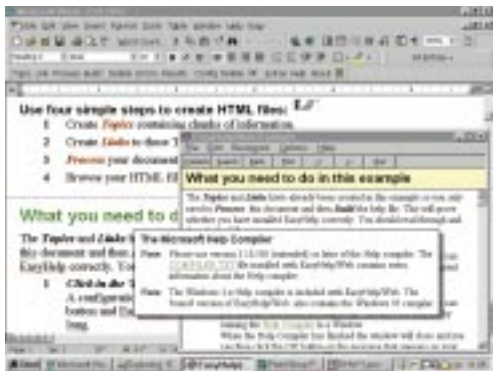
PCW Contact

Price £79.90 (£68 ex VAT)
Contact Micrografx 0345 089372 www.micrografx.com
System Requirements Windows 95 or NT.
Good Points A quick and easy way for non-experts to produce 3D models.
Bad Points Could have provided a better selection of images and textures; some are rather cheesy. Results will be better for a naturally creative person.
Conclusion Despite its limitations, Simply 3D 3 will get the job done quickly, easily and cheaply.
★★★★☆

Easy Help/Web 3

HTML without tears: turn Word documents into web pages or Windows Help files, the easy way.

Describing itself as a Hypertext Authoring System for Word 6/7/97, EasyHelp/Web is essentially an add-in template for Microsoft's Word. Using it, you can convert any Word document into either a Windows Help file or web pages, using HTML (HyperText Mark-up Language). You can then use these files on your own system as highly customised information sources, or distribute them to other interested parties — customers, for example. Typical uses would include price lists, catalogues and product specifications, organisation directories, procedure and technical manuals, and inventories.



There are plenty of examples and tutorials to help you

You cannot use EasyHelp/Web on its own. You need to have one of the supported versions of Word running first. Then, you can either create a new document based on the EasyHelp/Web template, attach the EasyHelp/Web template to an existing document, or load EasyHelp/Web as a global add-in.

Either way, you find yourself with an extra menu bar carrying an additional set of editing tools. These allow you to create Topics and Links; Process (convert) the file to hypertext format; and then to Build the Help file, using the supplied Windows Help compiler (not necessary for web pages).

The key to the procedure is the Topic, which is any piece of text you so define and which can be anything from a single line to a complete chapter in a manual. Position your cursor in the first paragraph and it becomes the topic heading. The topic ends where the next topic begins, or where the document ends.

Each topic is also a link destination, either as a "jump" or a "popup" in a Help file, or an individual page in a web site. You define the links as you wish, of course. While it could hardly be easier, note that it doesn't support advanced web features like tables and forms, although you can incorporate graphics.

You can actually use Word 97 to produce web pages on its own, but this can be a time-consuming and technical operation. The advantage of EasyHelp/Web is that it automates much of the process for you. What's more, your Word document is preserved, so you can use the same document for printing and for creating hypertext files.

James Taylor

PCW Contact

Price £188 (£160 ex VAT)
Contact Eon Solutions 01625 827037 www.easyhelp.com
System Requirements Windows 3.1, 95 or NT.
Good Points If you can use Word, you can use this.
Bad Points The price may be a little high for some.
Conclusion Simple generation of online hypertext without tears.
★★★★☆

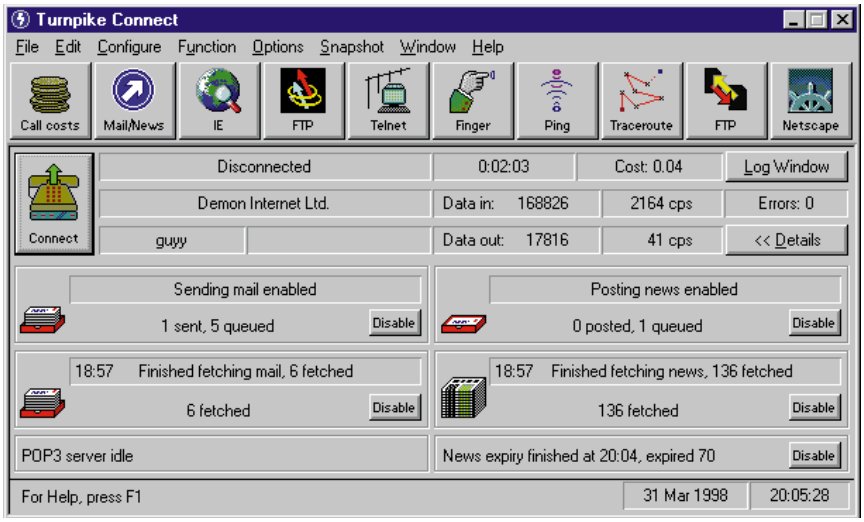
Turnpike 3.05

Turnpike is a fully-featured email and news editor for those who prefer to pay for their net software.

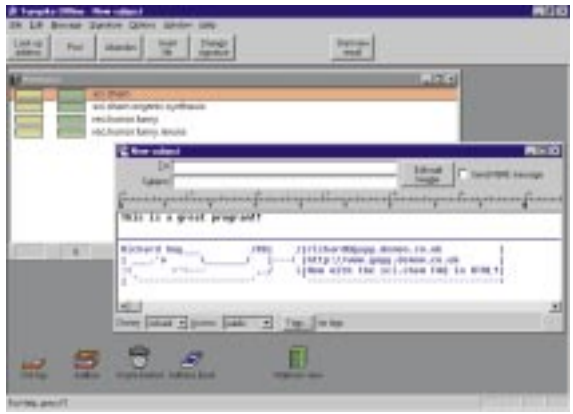
The name "Turnpike" refers to the suite of internet programs that Demon Internet would like all its customers to use (they own the company). The package includes programs to compose email and news messages (Turnpike), to connect to the internet (Connect), WS_FTP Pro and IE, as well as less significant telnet, finger, ping, and traceroute programs.

Turnpike is a fully-featured email and news editor that appears to do everything. The address book automatically stores the name and email address of everyone who emails you. Newsgroups are exhaustively handled: there are six possible ways of "killing" articles; all articles are fully searchable and classifiable; and URLs are automatically highlighted by the software — click on one, and it is added to an HTML file that you can open in your preferred browser when on-line.

Turnpike handles mailing lists too: subscribe and unsubscribe emails are generated for you, and the messages themselves are sorted neatly and put in a "newsstand" as they arrive. Personal emails, if you decide to file them in the "Mailroom" rather than condemn them to the "Wastebasket", can be classified, searched and forwarded. Attachments are dealt with seamlessly though not always competently, and you can even change the colour and type of font your messages are displayed in. Multiple usernames are supported.



Newsgroups are exhaustively handled in Turnpike, and personal emails can be classified and searched



Put a Winsock in it!

Connect is the program that actually connects you to the internet. The latest (v3.05) 32-bit incarnation has undergone quite a facelift, and it's the first to use the Microsoft Winsock and TCP/IP stack, which works with the Microsoft stack and Dial-Up Networking. All other versions offer a choice between Turnpike's Winsock and Microsoft's. If you use Turnpike's, then Connect handles your dialling. If you choose Microsoft's, then you have to find something else. Prior to v3.05 I used Turnpike's and it worked fine, but bear in mind that a non-standard choice of winsock is usually accompanied by trouble.

Once you are connected, Connect serves two main purposes. Firstly, it sends and receives all your news and email (POP3, POP2 and SMTP are supported) and passes it to Turnpike so you can read it off-line. Secondly, it is a customisable front-end for the rest of the Turnpike suite. For example, Turnpike comes with IE; if you loathe this program, choose not to install it and spend 30 seconds setting yourself up with a button to launch another browser.

Connect 3.05 has a "Calls cost" feature that keeps track of how long you're spending on-line and how much it's costing you. But don't worry, kids. The log can be swiftly deleted once mummy finds out it exists and how to access it (hint: it's the big button with the pennies on it).

Money problems

Money is Turnpike's problem. In this age of internet computing, you don't need to spend any once you've paid for computer, phone-calls and electricity. Windows 95 is shipped with perfectly good email/news programs, a WWW browser and ftp and telnet programs: anything that Turnpike can do, something else can do for free — though probably less well. Even if you don't like what Windows 95 comes with, then alternatives such as Eudora and Netscape can be downloaded or taken off cover CDs.

But Turnpike sells because it's good and cleverly marketed to every Demon subscriber. It's easy to set up and easy to use (easier still if you're with Demon) and you get to try out an evaluation version. Both programs are stable, and the on-line help isn't too bad. But for the clued-up who don't need a help file to tell them what RTFM stands for, Turnpike is unnecessary expenditure.

Richard Guy

PCW Details

Price Currently in v3.05, £29.37 (inc VAT)
Contact 0181 371 1234
Good Points Does everything. Idiot-proof.
Bad Points Do you need it?
Conclusion If you must buy your internet programs, this is an excellent choice.
★★★★☆

We welcome readers' contributions to our Long Term Tests section and pay for those we publish. If you've used a piece of hardware or software for some time, write a 600-word piece (plus two GIF-format screenshots for software reviews) and send it on disk in MS Word or ASCII format to Paul Trueman at the usual *PCW* address, marking your envelope "Long Term Test". Or email it to paul_trueman@vnu.co.uk

Software

2 YEAR TEST

Pointcast 2.0

How *PCW*'s resident Canadian keeps abreast of a wide range of news and views from home.

When I moved to the UK from Canada six years ago, one of the things I missed most was keeping up to date on what was happening at home. Who had won the Stanley Cup? Were people still inexplicably buying Bryan Adams and Celine Dion albums? Sure, I could buy a copy of the *Globe and Mail* at one or two newsagents — if I didn't mind paying £4 for a newspaper that, as often as not, was up to a week old.

So when I ran across Pointcast, a software product that promised to push all the latest news, sports and weather from the frozen north straight to my desktop, I was delighted. I was even more delighted when I found out that the good people from Pointcast would do so for free.

There are several versions of Pointcast you can try. If you have a PC, you can get the Business Network customised for Canadian, Japanese, Asian and US audiences, or if you have a Mac, you can try out the Business or College Networks (US only). Once you've downloaded your version free from the Pointcast site, you then decide what channels you want to receive. There are a huge number to choose from, but in my case, I've stuck with the Globe and Mail, CNN, Weather, Lifestyle, as well as IT channels CMPnet, Wired News and ZDNet.

Getting a geographically-specific view of the news

Since I have a leased-line connection, it never takes too long to update the information. But it pays to pare down your choices to the bare essentials, especially if you're using a dialup connection. I've heard complaints about Pointcast "taking over" the PC with its screen saver and news ticker. I've turned off these options because they're too distracting, and I don't let it run constantly in the background. This speeds up things considerably.

The variety of the channels has drastically improved, and if and when a UK version arrives, I'd recommend that you give it a try.

Susan Pederson

PCW Details

Price Free

Contact www.pointcast.com

Good Points Get instant updates on the latest news without having to trawl the internet

Bad Points It can take a long time to update, especially with a dialup connection. Screen saver and ticker can be annoying.

Conclusion Best for leased-line users, and those who need a North-American perspective.

★★★★☆

Hardware

1 YEAR TEST

HP LaserJet 5L

This splendid printer has survived some tortuous student treatment and is still going strong.

I bought the HP LaserJet 5L, together with my Pentium 166, about a year ago for about £500, even though the price dropped drastically only within weeks after my purchase.

At that time, it was probably one of the best printers around, being true 600dpi: most other home printers were only 300dpi. My opinion was confirmed when I saw the results from some 300dpi printers, which even at their highest resolutions did not even compare to the output produced by the HP.

Being a university computer science student, I started using the printer very heavily to print most of my reports, and sometimes also those of my friends, together with a multitude of notes which were either found on the net or given in PostScript format.

Some of these reports reach 150 pages and include graphics, text and graphs, and I must say that the results from the HP are more than satisfactory. Text is very sharp, graphics are extremely clear, and shading is very realistic.

With regard to build quality, the HP is quite satisfying, even though there were some drawbacks. The not infrequent paper jams when using normal A4 photocopier paper, is one example. This can be easily solved, however, by using special laser paper of a certain thickness.

The vertical design of the printer, even though saving a reasonable amount of desk space, is very much prone to dust accumulation on the inside, mostly through the wide paper tray rather than the paper feeder. This can be annoying, and will probably cause damage to the printer's internals in the long term.

Another amazing feature of this printer is the long toner life. I have been using the HP for a year, continuously printing documents and a whole raft of graphics, and I am still using the original toner supplied by the manufacturer.

Having seen a substantial number of other printers at work, the LaserJet 5L is surely a winner. I'm sure that its successor, the HP 6L, will carry on a great tradition.

Sergio Muscat

The HP LaserJet 5L gives efficient, top-quality print

PCW Details

Price The LaserJet 6L has replaced the 5L, and is priced at £310 (ex VAT)

Contact Hewlett-Packard 0990 474747 www.hp.com/uk/

Good Points Excellent print quality.

Bad Points Can pick up dust easily.

Conclusion Excellent value for money.

★★★★☆

p114 ➢

Hardware

6 MONTH TEST

Visioneer PaperPort Strobe

A nicely-designed and functional scanner that is ideal for the user with modest scanning needs.

The first Paperport was a true original: a platen (i.e. typewriter-style feed) scanner that fitted snugly between your keyboard and system box, bundled with a useful document-management software suite. It was not up to a full office workload, in that you could not push screeds of paper through it, but it was ideal for the home user or individual desktop for quick scans and translating the odd scanned document into editable text. I continued to use one, even though I really needed a heavier-duty model, simply for its convenience. And when the colour-enabled, Twain-compliant PaperPort Strobe came along I jumped at the chance to try it.

The Strobe retains most of the considerable advantages of its predecessor. One irritation was that the original version of the bundled Cardscan software, which makes a fair stab at reading business-card information into a database, allowed you to export in a generic format such as CSV. You now need to buy the full version of Cardscan to get this facility.

The Strobe is very elegant in design. It plugs into the parallel port via a cumbersome dongle which holds the power connection as well as a printer pass-through port. The feed mechanism is the weakest aspect of the design. You are supposed to flip up a rear paper-feed panel when scanning photographs to allow them to pass through without bending. But the panel has a tendency to fall off, pictures tend to slip, and it is often difficult to get them to feed in straight. The bundled software allows you to straighten them up again, but this is added work.

The Paperport Strobe

The prices of other types of scanners have fallen, and these will be preferable for many tasks. A small flatbed, for instance, will allow more precise scanning of high-definition pictures, and even average-sized offices are likely to need a model with an automatic paper feed. However, I have used the Strobe for several months with no major problems and would recommend it to users with little desk space and modest needs.

Clive Akass

PCW Details

Price £159 (ex VAT), with £30 cashback when you register.

Contact Visioneer 0800 973245 www.visioneer.com

Good Points Convenient, cheap, and easy to use.

Bad Points Picture feed could be better.

Conclusion Robust device for home or small office.

★★★★☆

Hardware

4 YEAR TEST

Canon BJC-600

Reliable and quiet, and capable of handling a hefty workload, the BJC-600 was a great buy.

I've had my BJC-600 since August 1994 when it cost me the princely sum of £540. Bubblejets were just coming into vogue and I was pleased as punch with the Canon's 360dpi. The top-mounted controls made the printer very user-friendly, and the four separate ink-tanks contributed greatly to economy. The print quality was superb for the time, and has not deteriorated yet, even though I've punished it mercilessly. According to the manual, the maximum media weight is 105gm, but I regularly print on 285gm card with no ill-effects. A friend reckons it would happily take plywood!

Old reliable: the Canon BJC-600

This printer is by far the quietest I have heard, which is important to me as my "office" is a converted bedroom where I often work late into the night while my wife sleeps in the next room.

My BJC-600 has caused problems only twice. The first time was when a dealer sold me the wrong refill inks and the print-head clogged. Luckily for me, the visiting Canon engineer showed pity and replaced the head free of charge under the warranty. That's service!

The second time was quite recently, when the machine refused to print and angrily flashed its LEDs at me. The manual told me, "Waste Ink-Tank Full". With the price and quality of printers available today, I was not about to pay an inflated call-out charge, so I had a go myself. After cleaning and drying the ink-soaked wadding in the space beneath the chassis, reassembling, and entering the correct control code, I was up and running again by the end of the day.

Despite its high original price, my BJC-600 has been worth every penny. Even if I buy a new printer, I'll probably still keep the Canon for as long as it lasts.

Ian Heath

PCW Details

Price The successor to the 600 is the BJC 620, priced at £259 plus VAT (304 inc VAT)

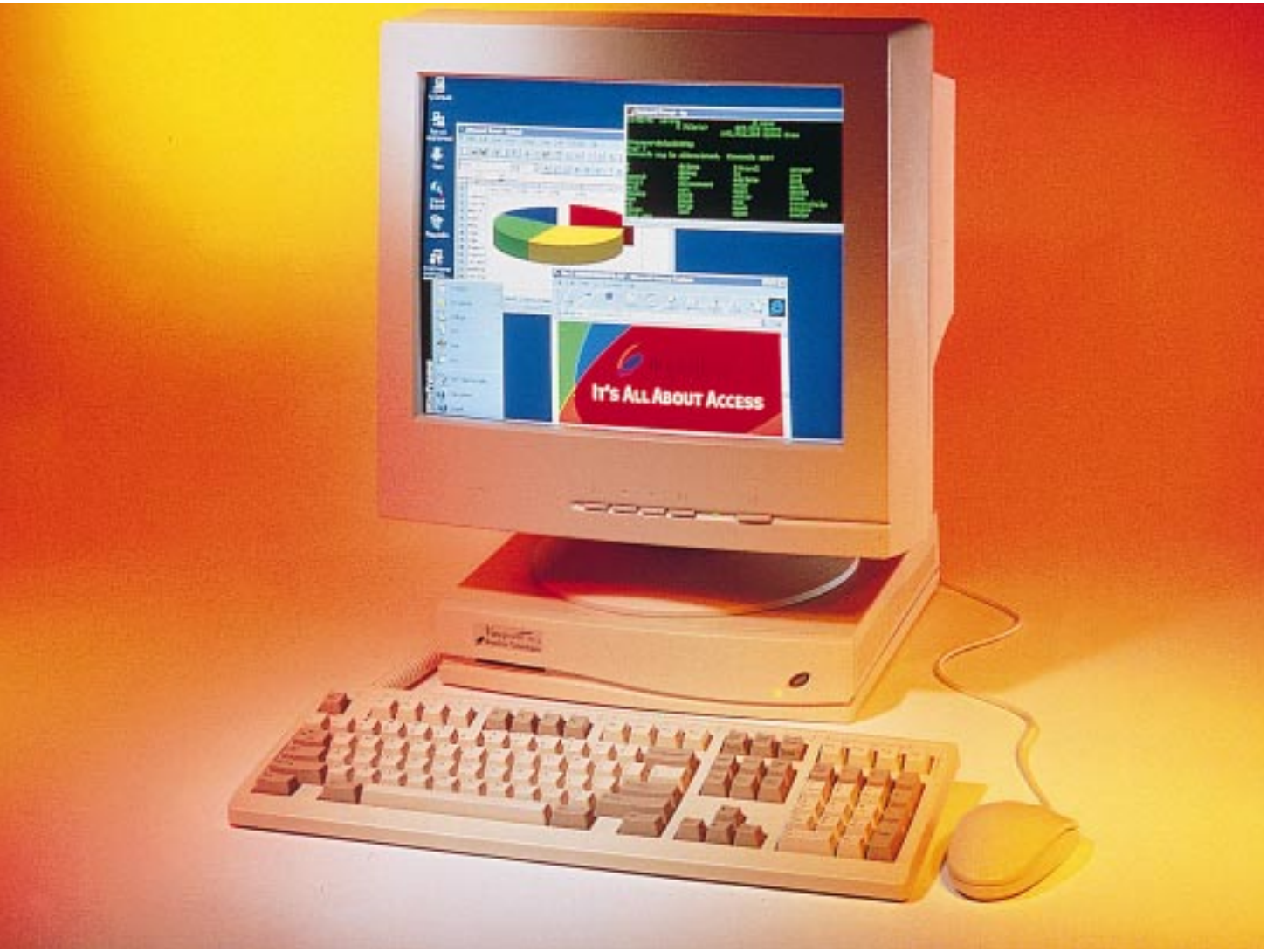
Contact Canon 0121 680 8062

Good Points Reliable, and can take a punishing workload in its stride.

Bad Points Originally quite pricey.

Conclusion A great buy.

★★★★☆



Network Computers Contents

Ratings

★★★★★	Buy while stocks last
★★★★☆	Great buy
★★★☆☆	Good buy
★★☆☆☆	Shop around
★☆☆☆☆	Not recommended

Get connected

Exactly what are Network Computers, and do we really need them? Alan Clark puts eight to the test while Terence Green takes us through the applications and operating systems.

You have doubtless heard the hype, but chances are you haven't actually seen a Network Computer (NC) in operation. Your organisation probably still uses a network of reasonably powerful PCs connected as clients to a file server, but is this the most cost effective and sensible way to manage your resources?

A PC network costs a lot of money to buy in the first place, with high hardware costs, but it costs a great deal more to maintain, both in terms of staff training and in the time and effort required to keep all that hardware and all those applications running smoothly. The NC offers the chance to cut costs because it is quite easy to manage the terminals, leaving the systems manager free to look after the server end.

This is the theory. In practice there are a range of opinions on just what a network computer is, how it should run, and, most importantly, *what* it should run. We have reviewed eight network computers and have looked at some of the server OSs they could work with, as well as some of the Java applications they might run. As the client/server option cannot yet be ruled out, we have also reviewed the latest Novell NetWare and previewed Windows NT 5 to give you the full run-down on all the options.

What is a Network Computer?

In the past year, the network computer (NC) market has diversified almost to the point where the name "network computer" means an alternative to the desktop PC. The IT market is now awash with such terms as thin client, fat client, NC, Windows-based Terminal (WBT), NetPC, and now Intel's lean client. The truth is that the NC, in any guise, does lower total cost of ownership and ease the management burden.

The NC concept means different things to different people. To some it spells the end of the brief client/server era. But the NC could be just the thing to help realise the potential of client/server computing by providing a cost-effective platform for a wide range of applications. In this environment, the NC shifts the balance of power away from desktop clients to various server types.

The desktop PC, with its vast storage and the memory requirements needed to run today's bloated operating systems and applications, is now classified as a fat client; conversely, NCs are referred to generically as thin clients. The fat client is becoming too unwieldy and the costs involved in support and maintenance are getting out of hand. The idea of the NC, akin to the dumb terminal, is simple: minimum processor and memory resources, plus a small, local hard disk for temporary storage of applications. These applications, most likely written in Java, are downloaded from the server via a web browser or another interface as and when required, and run locally. All user data is stored back on the server and all applications deleted when the session is finished.

The original idea was to relieve the client of all the storage and processing required by today's desktop operating systems and applications, shifting the emphasis to the application server and the network. This creates a central point of administration and reduces the cost of upkeep on the client stations.

The Java link to the NC was perfect for Sun which created the Java Station as the quintessential NC. Problems surrounding the development of the Java chip, which was to power this new range of thin clients, delayed Sun's initial product release and allowed other vendors to steal some of its thunder.

Dumb terminals

Other vendors have been quick to jump on the NC bandwagon and identify other areas in which to exploit the idea, such as the dumb terminal market. There are millions of IBM 3270 terminals still in use worldwide, which provide users with access to the 70 percent or so of the world's data that is stored on mainframes. The low cost of ownership of dumb terminals means many sites have resisted a wholesale move to PCs, restricting them to just those users who require the extra functionality and processing power required by desktop productivity or other client/server applications.

For these sites, the NC lets them embrace modern technology at a fraction of the cost. Furthermore they can retain their centralised management practices, avoid the administrative burden of installing software on each desktop and supply users with a single interface to all applications, whatever the platform. As it can connect to various hosts the NC has become, to many businesses, the ultimate universal client platform.

The Windows-based terminal

While many vendors decided to extend the original functionality of the NC by providing it with terminal emulation, mainframe access, Unix integration, and X-Windows support, others decided to concentrate their efforts in niche areas. So, the WBT was born. WBTs have been around since the early nineties (a few years before NC) but only since the introduction of the NC have the full functionality and benefits of WBTs been realised.

The WBT, like the original NC specification, has minimal processor and memory resources, but no local storage. It connects to a Windows NT server, but the server runs a modified version of the operating system that allows multiple users to connect and run applications on the server itself. Operating systems, such as Citrix Winframe, offer this multi-user Windows NT functionality and Citrix has licensed the code to Tektronix, Insignia and NCD. While the applications are run solely on the server itself, display and mouse information are transmitted over the network to the terminal by means of the Independent Computing Architecture, again developed by Citrix; this is the only interaction between client and server. Microsoft's latest project, codenamed Hydra, is a multi-user version of NT4 that will provide the end user with all the additional functionality of NT4 with the server-centric advantages of the WBT (*see p122*).

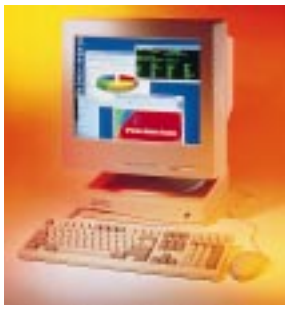
Not to be outdone, Intel and Microsoft jointly produced the NetPC reference specification. A NetPC is a standard desktop PC without a floppy or CD, but using standard processors and memory, running Win95 and connecting to NT servers. The client OS and applications are stored and executed locally but the emphasis moves to a centralised, server-based administration and data storage.

The latest specification is the lean client from Intel. Initial impressions of this new specification suggest an expansion of the WBT to encompass a wider range of server operating systems while retaining the server-based application execution and processing. Intel hopes that its Lean Client System Design Guidelines and Network Server Configuration Guidelines for Lean Clients will enable OEMs to deliver integrated solutions incorporating Intel architecture running on a common platform.

These various specifications have confused matters and it is unclear which will win overall as each fits a specific user requirement. Although it may not replace the conventional desktop, the NC in its various guises will certainly complement today's network environments.

p118 ➢

Boundless Technologies Viewpoint TC200



The TC200 is a WBT and provides connectivity to all the multi-user Windows incarnations, including Hydra and the ICA protocol. This protocol doesn't demand a huge amount of processing power but the TC200 is built around a 133MHz 5x86 processor and comes with 4Mb of RAM as standard, upgradeable to 64Mb, with 4Mb of flash RAM and 1Mb of VRAM. All this may sound like overkill for a simple WBT but by adding an optional software module and, if necessary, an internal hard disk, the TC200 can be upgraded for internet/intranet environments or Java applications.

There is a range of ports, including two serial, one parallel, two PS/2, a video and 10BaseT-network connectors. Optional 10Base2 and 100BaseT-network ports and a Token Ring module are available. There is a standard three-pin power connector. Unlike other NCs in this review, it has no separate external power supply and is the only system to provide PC-style expansion (one ISA slot, one PCI slot, with a Type-II PC Card slot).

Management is through the Viewpoint Administrator software. It provides the network administrator with an interface for managing all Viewpoint devices across the network, from the Administrator's workstation or from a remote system.

PCW Details

Price £642.73 (£547 ex VAT)
Contact Boundless Technologies 0031 345 565656 www.boundless.com
Good Points Expansion through ISA and PCI slot.
Bad Points Limited video support.
Conclusion Good spec let down by low VRAM.
★★★½☆

NCD Explora 451

One of the things that is immediately striking about the majority of NCs is their styling: the Explora 451 looks more like an external modem than a computer. On the rear of the machine there are all the usual connectors: power, serial, parallel, video, and a 10/100 auto-sensing RJ45 network connector. The two PS/2 connectors are on the underside of the unit (bizarre!) but the stand keeps the unit raised high enough off the desk for the cables to sit freely. There is also a single Type-II PC card slot for a wireless network card, while 10Base2 and Token Ring network connectivity are optional extras.

The 451 offers an all-round mix of Windows, Unix and legacy connectivity. The hardware is powered by a 66MHz PowerPC chip and comes with 8Mb of RAM as standard, expandable to 128Mb. The S3 graphics chip with 2Mb of video RAM gives a maximum resolution of 1,280 x 1,024 and there is an 8-bit audio chip.

Included with the Explora 451 is version 5 of NCDware, NCD's own embedded OS which provides the local ICA client, Java virtual machine, browser, wireless connectivity and lightpen support. Installation of the device is straightforward: simply install the NCDware software on to the appropriate server and attach the Explora 451 to the network. Windows connectivity is serviced by NCD's WinCenter software, a licence of Citrix Winframe with a few enhancements.

PCW Details

Price £830.73 (£707 ex VAT)
Contact NCD 01753 736600 www.ncd.co.uk
Good Points Support for Windows, legacy and Unix environments.
Bad Points Limited expansion potential.
Conclusion A good all-round NC.
★★★★½

Neoware Systems NeoStation 540

Personal Computer World Highly Commended

Last year HDS changed its name to Neoware Systems to reflect a shift from hardware vendor to a more software-based company. This is one of the products that reflects that change.

Offering a different style from the other NCs, the NeoStation 540 can be mounted flat or on its side, with a small stand. The front has the on/off switch and headphone and microphone inputs, the latter accompanying the built-in mic. Connectors to the rear include two serial, one parallel, two PS/2, video and a 10BaseT-network connector. There are two Type-II PC Cards or one Type-III slot; a 40Mb Type-III hard disk was provided with our model. Network interfaces for Fast Ethernet and Token Ring are available via PC Card support.

Powered by a 25MHz Intel i960 processor, the NeoStation 540 can be upgraded to 132Mb RAM with an optional 6Mb of flash memory. The video hardware supports resolutions up to 1,600 x 1,200, making the NeoStation 540 ideal for graphical applications. Running Neoware's netOS software, a variety of options is available for accessing Windows apps, mainframes, minicomputers, Unix applications, Java and the internet. Upgrading to netOS for the Enterprise Edition brings you Unix connectivity along with 3270 and VT320 terminal emulation, with a further 32 terminal emulators available for accessing Enterprise systems.

PCW Details

Price £540.50 (£460 ex VAT)
Contact Neoware Systems 01344 382164 www.neoware.com
Good Points Excellent expansion potential.
Bad Points None worth mentioning.
Conclusion Excellent all-round NC catering for Windows, legacy and Unix.
★★★★☆

Tektronix NC217

Personal Computer World Editor's Choice

Tektronix's 200 series is probably the most modular, expandable system in this benchtest. The NC217 has an unassuming design. The front panel has an on/off button and a power LED. The left-hand side has a variety of audio connections for headphones, a microphone and audio in and out. There are the usual array of connectors: two serial, two PS/2, parallel, video, 10BaseT-network and a range of expansion modules with a good selection of empty ports. Options for the NC217 include 10Base5-, 10Base2- and an autosensing 10/100BaseT-network connection, PC Card slots, and an MPEG-1 digital video card, along with a small video camera. This range of options demonstrates the versatility of these devices. A large surround overshadows all the connections. It covers all the unsightly cables and increases the surface area of the NC217, providing a monitor stand.

Built around a 100MHz NEC4300 processor, the NC217 comes with 8Mb of RAM as standard, expandable to 128Mb. As well as providing connectivity to multi-user Windows applications by way of Tektronix's WinDD, the NC217 offers a range of host connectivity options, terminal emulations, Java support and a local web browser. All this connectivity is provided by Tektronix's NCBridge application. Versions for both NT and Unix are available.

PCW Details

Price £1,169.13 (£995 ex VAT)
Contact Tektronix 01628 403300 www.tektronix.com
Good Points High degree of expandability and modularity.
Bad Points Unassuming design.
Conclusion An ideal solution for some very demanding environments.
★★★★★

Wyse Winterm 2310SE

The Winterm 2310SE is a basic Windows-based terminal. With a background in the terminal market, Wyse has been making WBTs since the early nineties.

The 2310SE provides connectivity to multi-user NT environments such as Citrix Winframe and Microsoft's own Hydra product by way of the Citrix-developed ICA protocol now known as pICAsso. Optional firmware support for Microsoft's TSHARE protocol, now known as the Remote Desktop Protocol (RDP), is available.

Two serial ports, a parallel port, two PS/2 connectors, a video connector, a Type-II PC Card slot and a 10BaseT-network connector make up the usual range of connectors at the rear of the unit. 100BaseT and Token Ring network modules are also available.

Unlike other NCs in this benchtest, the Winterm 2310SE has minimal memory requirements: 1Mb of code space for downloading the thin client software (upgradable using flash RAM), 1Mb of video RAM providing a maximum resolution of 1,024 x 768, and a further 2Mb for cacheing. This may seem paltry for such a device, but it's more than adequate for multi-user Windows NT environments.

For users who simply require Windows-based terminals without any of the other features offered by NCs, the Winterm 2310SE is an excellent solution.

PCW Details

Price £558.13 (£475 ex VAT)
Contact Wyse 01189 342200
www.wyse.co.uk
Good Points Good for basic Windows connectivity.
Bad Points Offers none of the other features of an NC.
Conclusion Not a true NC, but fine as a WBT.
★★★★☆

Wyse Winterm 2600SE

Personal Computer World Highly Commended

Wyse has taken its thin client technology and introduced it to many diverse environments.

Although still a basic WBT, the 2600SE, with its integrated 12.1in LCD, is the ideal solution for meeting the emission-free requirements of medical and other such environments. With this in mind, Wyse has built into the casing a mounting point that could as easily be attached to a rolling cart as it could to a wall, to provide maximum visibility with a minimum footprint. Add to this an optional touch screen that works equally well with a finger as it does with a stylus, and you have the perfect solution for multimedia booths, information points and similar applications.

Behind the cable shroud at the rear of the unit is the usual array of connectors: two serial, one parallel and two PS/2 ports, one Type-II PC Card slot and a 10BaseT-network port. Of the four other RJ45 connectors, only two are used; one for the optional magnetic strip reader, the other for the touch screen.

A small control panel under the screen, with an on-screen display, lets you adjust the screen contrast, horizontal and vertical positions, stability and brightness. There's an on/off button and an LED indicating power and sleep modes.

As the Winterm 2600SE clearly demonstrates, NCs can be introduced into environments where computers would not otherwise be feasible.

PCW Details

Price £1,997.50 (£1,700 ex VAT)
Contact Wyse 01189 342200
www.wyse.co.uk
Good Points Integrated 12.1in LCD.
Bad Points Expensive for a WBT.
Conclusion Novel approach to the WBT.
★★★★☆

Editor's Choice

Personal Computer World Editor's Choice

Of the six network computers submitted, we had a mix of standard WBTs and traditional NCs. The designs were all refreshingly varied, with some offering greater expandability than others. Unfortunately, neither IBM, with its NetStation 1000, nor Sun, with its Java Station, were able to submit products for this group test, but we have taken a look at their NCs (*p120*). We also decided not to look at NetPCs as they are essentially standard PCs minus the removable storage.

When choosing an NC there are a few points to consider, depending on its intended environment and usage. If there's a chance you could be deploying some heavy Java applications, you'll need an NC that can handle large amounts of RAM and preferably one that uses an above-average processor. Likewise, if all you need is a WBT, there's no need to go for a high-end NC with more options than a Swiss Army knife.

All the NCs and WBTs in this group test are compatible with the ICA protocol developed by Citrix, and the Remote Desktop Protocol (RDP), formerly known as T-Share, developed by Microsoft for its multi-user Windows product, Windows Terminal Server. Depending on your needs for legacy connectivity each of the NC vendors offers a range of host connectivity and terminal emulation options. Of the six devices we looked at, three models in particular stood out.

The **NeoStation 540**, from Neoware Systems, is **Highly Commended** as it is an excellent all-round NC catering for Windows, legacy and Unix environments. The implementation of two Type-II PC Card slots to create a single Type-III slot gives you the ability to make use of PC Card storage devices, further extending flexibility.

Although it's a WBT, the **Winterm 2600SE,** from Wyse, is a novel and interesting approach to NCs. Its LCD opens up a range of possible applications in some very specialised markets. **Highly Commended.**

Our **Editor's Choice** is the **Tektronix NC217**. It offers powerful hardware combined with a wealth of expansion options, to create a singularly flexible device able to cope easily in some very demanding environments.

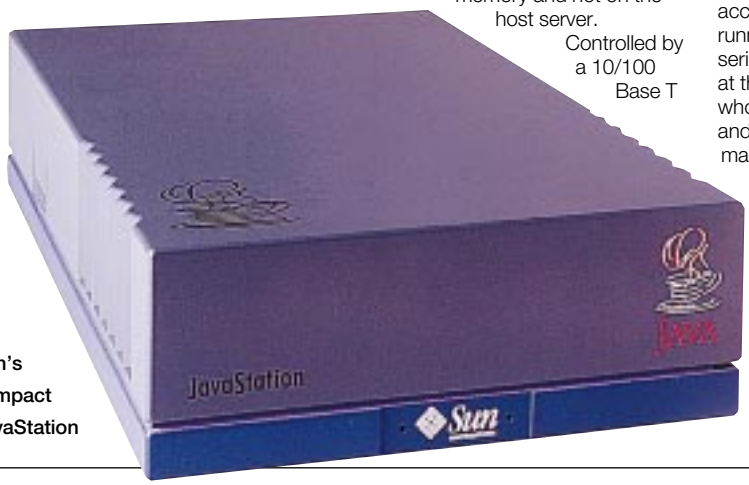
p120 ➢

Sun JavaStation and the IBM Network Station

The two largest players in the market, Sun and IBM, were unable to send us machines for review in time to meet our deadline, so here we have summed up their approaches.

Sun JavaStation

Sun has just launched the second version of its JavaStation. Based on the Microsparc 2 processor and incorporating Hot Java Views as its desktop environment, it also bundles a number of personal productivity applications along the lines of calendar and email clients. The advantage of using a Java-based OS, says Sun, is that it allows the safe incremental installation of software. Users' machines can be updated without the need for lengthy reinstallation routines and, unlike old network terminals, the software remains resident in flash memory and not on the host server. Controlled by a 10/100 Base T Ethernet connection, more than 1,000 companies are already selling Java applications suited to this environment. Even so, Sun acknowledges that increased bandwidth, especially in home and WAN environments, and a more impressive selection of Java applications are necessary before this technology takes off in a big way.



Sun's compact JavaStation

IBM Network Station

IBM remains the largest player in the NC market. It has been selling NCs since March 1997 and has already filled a number of large-scale orders for organisations which are replacing either dumb terminals running on mainframe architectures or PCs running Windows applications.

IBM has three series of NC, each called Network Stations. The 100 series is a cross between a dumb terminal which will access legacy mainframe applications, and a WBT for running Windows-based apps on an NT server. The 300 series has more processing power on the client and is aimed at those people who need to run applications on a server, but who also need a browser on the machine to access intranet and internet sites. Finally, the 1000 series is a more powerful machine which comes with Lotus eSuite (*p125*) and is designed to run Java-based applications. IBM foresees that most corporations will use eSuite simply as a front-end for plugging in their own Java applications.

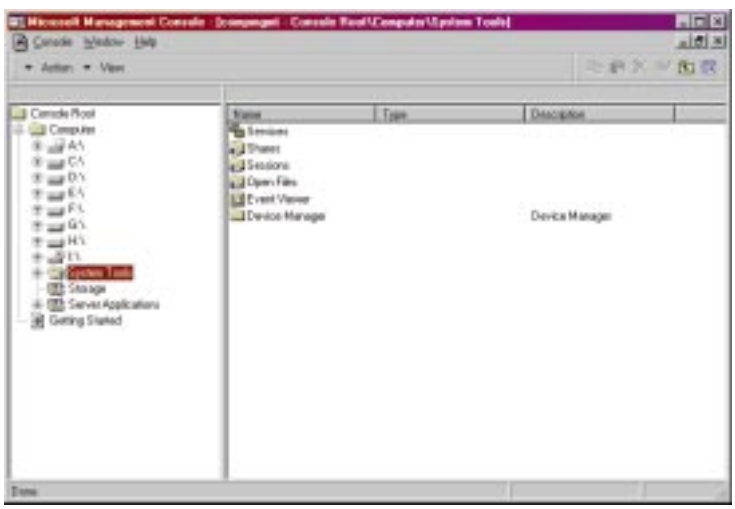
IBM sees Java taking an increasing share of the NC market as large corporates re-code legacy mainframe applications into Java, although Windows-based NCs still have an important part to play. IBM sees the rise of NCs as offering organisations greater flexibility and something which will strengthen the role of a server-based architecture, rather than simply take market share away from PCs.

Windows NT 5.0

Although depicted as a rival to the Windows platform, the NC is more accurately one aspect of the industry-wide belief that networked desktop PCs are complicated to use and expensive to run.

Not surprisingly, Microsoft's views on NC appear to differ from those of the proponents of network computers, but it would be a mistake to think there's any difference of opinion over the basic concepts driving networked computing. Everyone agrees there's going to be more emphasis on the server in order to reduce costs and provide a solid platform for distributed (for which read web) applications.

This is clear from the early limited betas of Windows NT 5.0 that have been circulating for some time, and the release of Windows NT 5.0 components in NT 4.0 Service Packs and the Option Pack for Windows NT 4.0. These releases delivered the web-based application development tools upon which Microsoft's Distributed interNet Architecture (DNA) is based.



The Management Console will be at the heart of Windows NT 5.0

The first feature-rich beta of Windows NT 5.0 this month will be replete with a host of new and enhanced management and administration tools that enable DNA to be deployed cost-effectively on a Windows platform. Initially, Microsoft hopes to remove much of the complexity at the client desktop by automating the desktop configuration. But not everyone will win. Things will be more complicated for the network administrator to begin with, which makes it all the more important that personnel responsible for Windows networks get on the beta programme early even if they don't intend to upgrade in the near-term.

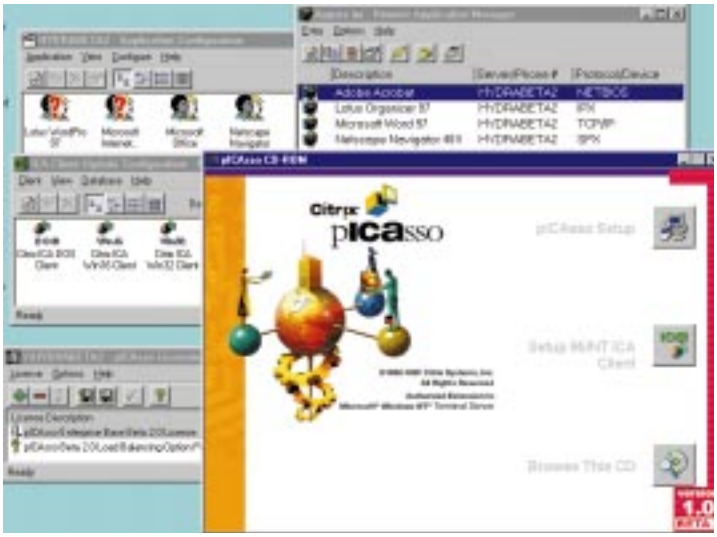
Management of Windows NT 5.0 will be centred on the Management Console and will be web based to enable it to be integrated into enterprise-wide solutions from Hewlett-Packard, IBM and Computer Associates. Windows NT 5.0 will feature automated software delivery and configuration with self-healing properties and full support for roaming users. This will throw a lot more responsibility onto the Windows NT Server and the hardware on which it runs.

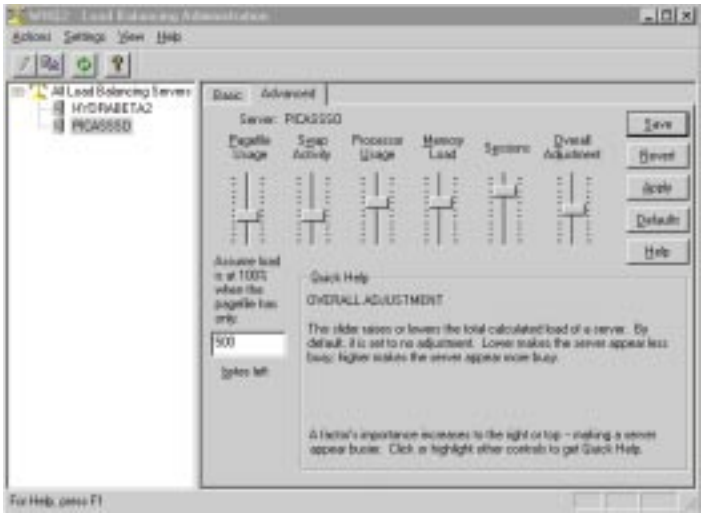
In order to derive the maximum benefit from Windows NT 5.0 though, the best client will be Windows NT Workstation, with Windows CE-based terminals coming in second place. Windows 98, while slightly more manageable than Windows 95, remains the most unruly member of the Windows bunch.

p122 ➢

Microsoft Windows Terminal Server

Network computing for Windows is handled by Microsoft Windows Terminal Server, originally codenamed Hydra, the multi-user version of Windows NT 4.0 for Windows PCs, NetPCs and Windows-based terminals built around Windows CE. Multiple users can log into Windows Terminal Server simultaneously to run





Top To get the best from Windows Terminal Server you need its Citrix MetaFrame Above 32-bit Windows apps load into shared memory, reduce memory drain, and provide better performance and reliability

independent sessions. The applications started by users are executed on the remote server but displayed on the user's own screen. Most applications supported by Windows NT are also supported by Terminal Server. As clients only need to run a small piece of client code, it is possible to serve up Win32 apps to non-Win32 systems and to older hardware that lacks the power to run such applications locally.

Terminal Server is not ideal for processor- and memory-intensive applications and doesn't support multimedia, but it enables applications to be deployed more flexibly. Power users of these applications are kept up to date with new hardware, while older systems can be redeployed as Terminal Server clients for non power users. So Terminal Server provides the Windows world with some of the benefits of network computing by enabling network processing resources to be organised more efficiently.

Terminal Servers have to be well-equipped with a 32-bit architecture and 4Mb RAM per ordinary user or 8Mb RAM per power user, over and above the server's needs. A 120MHz Pentium with 96Mb RAM would suffice for 15 ordinary users, but add power users or more clients and a multiprocessor server becomes advisable. Although Terminal Server runs any application which runs on Windows NT, 32-bit Windows applications which load into shared memory reduce the memory drain and provide better performance and reliability. On its own, Windows Terminal Server supports Windows NT, Windows 95, Windows for Workgroups and a new range of Windows CE-based terminals from Wyse, Boundless, NCD and others. Clients employ the NetMeeting T.Share protocol (now called Remote Desktop Protocol) which requires TCP/IP.

Citrix MetaFrame

Citrix MetaFrame is a supplementary package which extends Windows' reach to virtually any client platform and adds sophisticated management, administration and ease-of-use features. Terminal Server itself is based on MultiWin technology licensed by Microsoft from Citrix WinFrame.

MetaFrame delivers the bits Microsoft didn't license, most especially the Citrix ICA client which is optimised for low bandwidth connections and minimal client processing. ICA supports TCP/IP, NETBIOS, IPX/SPX and SLIP/PPP connections and the Secure ICA protocol enabling Terminal Server to be configured to the C2 security level.

MetaFrame is of major benefit to large enterprise networks with a mixture of client systems, as it enables almost any computer or device to log in and "run" Windows applications on a Windows Terminal Server. This includes Windows 3.1 and DOS, Mac and Unix systems, and even web browsers. There are ActiveX and plug-in clients and a Java client, too. The web browser and Java clients can be tested online by visiting the demonstration area at www.citrix.com.

In addition to enterprise-wide access, MetaFrame simplifies server, applications and client management, adding point-and-click applications configuration for multi-user access via LAN or dial-up with full access control for explicitly-named and anonymous users. MetaFrame also enables web access to Windows applications with ALE (Application Launching and Embedding). Windows applications can be linked to web pages without writing HTML and launched from the client's browser into a separate window, or to run within the browser window.

MetaFrame server management support includes load balancing for multiple servers and the ability to monitor and tune the service dynamically. Server administrators can "take over" a remote client and work with the user to fix problems or demonstrate procedures.

Ease of use

For users, MetaFrame includes drive, port and printer mapping. Under Windows Terminal Server, client system drives and ports take the addresses of the server's drives and ports. On a PC, the client's own addresses must be mapped after the server's; so the server would provide the C: drive, and the client's own C: drive would have to be mapped to D:. The same goes for printers. MetaFrame maps addresses so that clients retain their logical drive, printer, and serial port addresses.

MetaFrame supports "seamless windows" on clients. Windows Terminal Server sessions normally execute within a remote desktop window, but MetaFrame allows the remote applications to run in their own windows and enables cut and paste between these windows, too. Terminal Server is required for MetaFrame and is sold as a server package. The basic package supports up to 15 clients but the clients themselves are free, and the latest client packages can always be found on the Citrix web site. It requires a Windows NT 4.0 server licence, though, and the standard Microsoft client licensing applies to clients attaching to the Server.

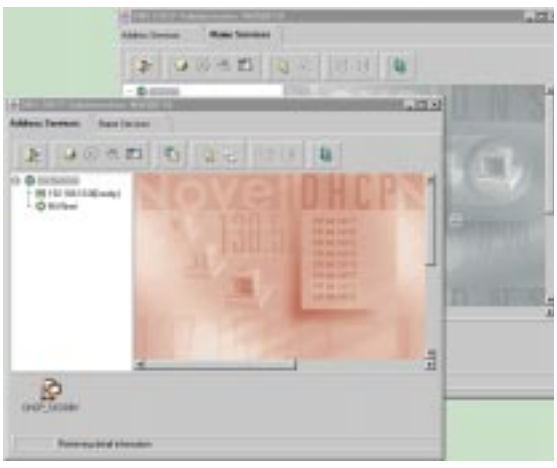
Terminal Server provides a new level of flexibility for network administrators delivering Windows applications to Windows-based networks and offers potentially significant management cost reductions. The Citrix MetaFrame add-on package extends Terminal Server to encompass the mixed range of clients found in most large networks, delivers ease of use for clients and administrators, and adds enterprise-class management tools.

p124 ➢

Novell NetWare 5

Novell NetWare has lost ground to Microsoft Windows NT in recent years. But the game is on again because NetWare 5 is not your father's NetWare. Based on internet standards, Java-enabled for cross-platform applications, year 2000-compliant and with a secure global directory service in NetWare Directory Services, NetWare 5 is set to take PC networks into the next millennium.

Many NetWare users will not feel the need to upgrade immediately, but NetWare 5 lays out the road ahead for NetWare. And it is a very clear route, signposted and secured by NetWare Directory Services (NDS) and open to anyone using internet standards-based software. NetWare 5 now defaults to IP-only although traditional NetWare IPX is still supported, and several co-existence options allow a measured migration from earlier versions.



Compatibility mode enables IP NetWare 5 servers to service IPX applications and clients because NetWare core services, although now implemented in IP, can still respond to IPX requests.

Mixed IPX and IP networks can be accommodated by Migration Gateway, which creates a virtual IPX network at the NetWare 5 IP server and routes traffic to IPX segments. A Bindery Gateway supports NetWare 3.x co-existence.

Above NDS is the key to NetWare's future

NetWare 4 and earlier servers can co-exist, but NetWare 3.x holdouts who have been wondering whether to switch to Windows NT now have a clear choice between waiting for Windows NT 5.0 or upgrading now to NetWare 4.11 or 5.0 in order to participate in NDS.

NetWare Directory Services

Now IP-enabled, NDS includes integrated DNS (Domain Naming System) and DHCP (Dynamic Host Configuration Protocol) services as well as a global catalogue which can be queried by applications using the Lightweight Directory Access Protocol (LDAP). NDS also has an Active Directory Service Interface enabling it to be supported by the Microsoft Active Directory due in Microsoft Windows NT 5.0. A Service Location Protocol (SLP) conforming to internet standards provides the network discovery service formerly handled by the IPX Service Address Protocol (SAP).

Since NetWare 5 supports internet standards, it becomes possible for anyone to access NetWare 5 services over the public network with standards-based software. Provided they have the right authentication, NDS will allow them to browse the directory and will only reveal resources for which they have permissions. NetWare 5 NDS includes a cryptographic services layer supporting the Secure Socket Layer (SSL) now, and extensible absorb internet standards for privacy, certification, and non-repudiation as they emerge.

Java

With IP and NDS, Java is the third member of the NetWare 5 triumvirate. The Java engine in the kernel supports server-side Java "glue" to unite clients with back-end databases in cross-platform applications. Java enables Novell to provide cross-platform administrative tools and allows users to access NetWare services with the same tools from multiple platforms, thus keeping training costs down.

In the beta we viewed, the first indication of NetWare's Java future appears during the install process when a Java console fires up to take you though the rest of the install process. NetWare 5 will include a number of Java-based utilities which snap into a Java-based "ConsoleOne" administrative console. It won't happen overnight, but eventually all NetWare administration utilities will be Java based.

Java also enables Novell to offer developers a standards-based applications development environment. Programmed access to NetWare 5 network services is available through a variety of new routes, including Java and JavaScript. For the developer, NetWare 5 includes an integrated Java development environment, a debugger, support for JavaBeans for NetWare, and a CORBA-compliant ORB (Object Request Broker).

Kernel enhancements

The server kernel has been rewritten to support multi-processor systems, virtual memory, Java, and a scheduler which enables applications to be prioritised. A protected memory environment enables server applications to be loaded into protected memory (Ring 3) where, if they happen to crash, they will not take the server down. Hardware support has been updated, Hot Plug PCI support added, and a fast 64-bit indexed storage system supports file sizes up to eight terabytes. Server clustering is an optional extra.

Other new features include an enhanced version of the NetWare SBACKUP utility, a five-user version of the Oracle 8 database, Netscape FastTrack web server, Netscape Communicator web browser, and NetWare online documentation in HTML format.

The administrative tools included — Novell Application Launcher & Workstation Manager, which enable applications to be distributed automatically to both desktops and roaming users — are a subset of the ZEN (Zero Effort Networks) package which will be available separately. The full ZEN package, announced in February and now in beta, adds desktop asset management, administration and remote support, and problem-solving options. The recently-shipped NDS for NT package which brings Windows NT domain management into the NetWare fold is not included but will be available as an extra-cost option for NetWare 5.

NetWare can also be extended with Novell's ManageWise network management and GroupWise messaging and groupware options.

With NetWare Directory Services, the Java engine and IP services, Novell's new NetWare 5 enables companies to connect to the world at large while maintaining tight control over the security of their network resources and stored data.

Java Office Suites

Java — OK for animated web pages but no good for office applications? Pioneering work from Corel and Lotus has not only rendered this a moot point, but has also produced innovative Java tools and technologies.

Converting an existing office suite to Java is a very bad idea, as Corel demonstrated in 1997 when it released the Corel Office Suite for Java. It's something CEO Mike Cowpland publicly admitted recently while introducing much better Java-based products.

A much smarter idea was analysing the work done by office workers in order to define the 20 percent of must-have features for office applications, and this helped Lotus deliver eSuite, a lightweight Java office suite for network computers and Windows PCs alike. Lotus also came up with the InfoBus which allows Java applets to share and exchange information with no programming required. InfoBus was recently incorporated into the Java specification.

Lotus eSuite

The server-based applets are presented on the client systems within the eSuite WorkPlace desktop which runs on any client with a Java Virtual Machine. The applets communicate via the InfoBus to enable, for instance, a chart to be incorporated into a document. Since it is server based, each person's eSuite WorkPlace maintains its state when they log off and they can return to their tasks as they left them when they log on again.

eSuite applets don't provide heavy-duty DTP and financial modelling services but there's nothing to stop them being used in conjunction with full-blown applications. The primary aim of eSuite is to provide the basic tools that most office workers use, in a framework that can easily be extended if necessary, and to make them easy to use in order that management and training costs are kept low. The demo version we reviewed is certainly easy to use, with lots of colour and clearly-marked task-orientated menus which pop up on a single click of the mouse.

If necessary, developers can extend the capabilities of eSuite with eSuite DevPack which packages the applets as JavaBean components. DevPack doesn't have to be used in conjunction with eSuite WorkPlace. It complements any developer tool that supports JavaBeans, from web-page editors to full-blown programming languages. Lotus has signed up several licencees who will bundle eSuite, including Netscape NetCenter, Novell, Sun, IBM and Oracle. AOL plans to give the email component to its users.

Corel

Corel may have stumbled with Corel Office Suite for Java, which made a brief beta appearance at the beginning of 1997, but it has learned a lot. In March this year it bounced back with Corel OpenJ and jBridge. OpenJ is foundation technology which enables web applications to be assembled quickly and easily from JavaBean components.

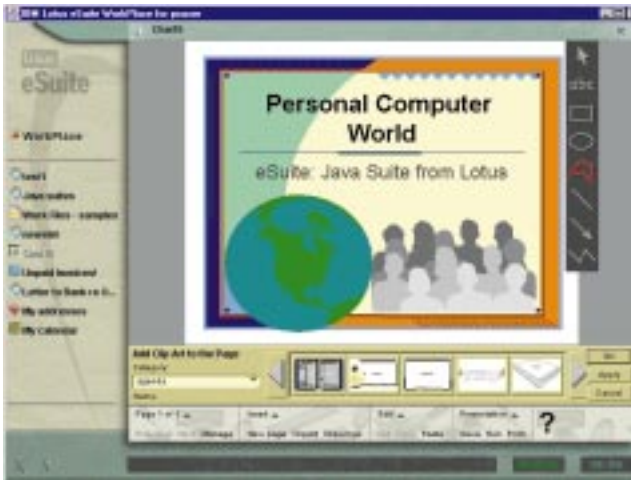
OpenJ works with any Java Virtual Machine on any hardware and is based on Applications Description Markup Language (ADML). Developed by Corel, ADML can be used to create applications with any text or XML (eXtensible Markup Language) editor.

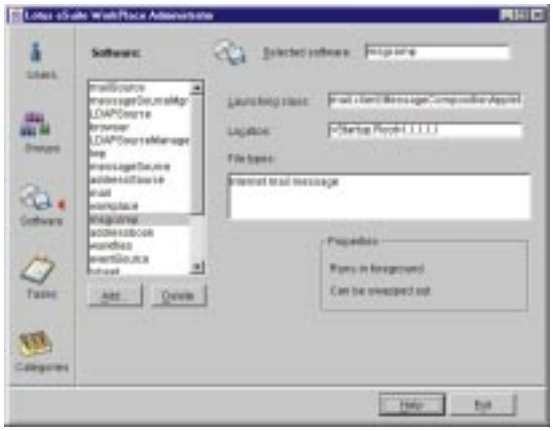
Corel jBridge, a thin-client/server technology, enables 32-bit Windows applications running on a Windows NT server to be displayed on any Java-enabled client (it sounds very much like Citrix MetaFrame for Windows Terminal Server).

Corel is also working on jSuite, a set of office applets due to ship this summer alongside Corel's own network computer and the OpenJ and jBridge tools.

Directions

Lotus may have been faster on the uptake than Corel but the lesson is the same. Java is not a new way of creating old tools. It's a tool for producing new ways of working. The Lotus and Corel products look at the way we work now, and then utilise and extend Java to reveal new methods which are not apparent when locked into a "software upgrade/hardware upgrade" cycle. What especially appeals is that these new Java products do not mandate any major changes in existing ways of working, since they embrace and extend the Windows desktops we already have. They enable the processing load to be distributed more evenly while centralising management at the server where it is much easier to control. This squares neatly with the networked computing path that both Microsoft with Windows NT 5.0 and Novell with NetWare 5.0 are following. Processing is split between the server and client while data management is controlled by the server.





The Lotus and Corel products are also the first from major vendors to point to the benefits of Java "servlets" that run on the server and display on clients. Servlets can replace CGI scripts and enhance web servers, but they can do much more because they support the JavaBeans component model, Java Database Connectivity (JDBC) and the Remote Method Invocation (RMI) for distributed applications. As Java develops — and let's not forget that it's barely three years old — it is becoming obvious that its forté is in providing the glue for distributed applications of which Lotus eSuite is an early but very worthwhile example. Corel's Java applications, due for release this summer, will enable businesses to create cross-platform business applications, incorporating 32-bit Windows applications if they wish, without having to become Java programmers. Lotus eSuite is available now and can be put to use immediately in an office environment.

■ **Contacts** Lotus eSuite esuite.lotus.com; Corel Java www.corel.com

Above Lotus eSuite comprises a suite of task-orientated Java applets: word processor, spreadsheet, calendar/ scheduling, email, address book, and presentation software

p126 ➢

Conclusion

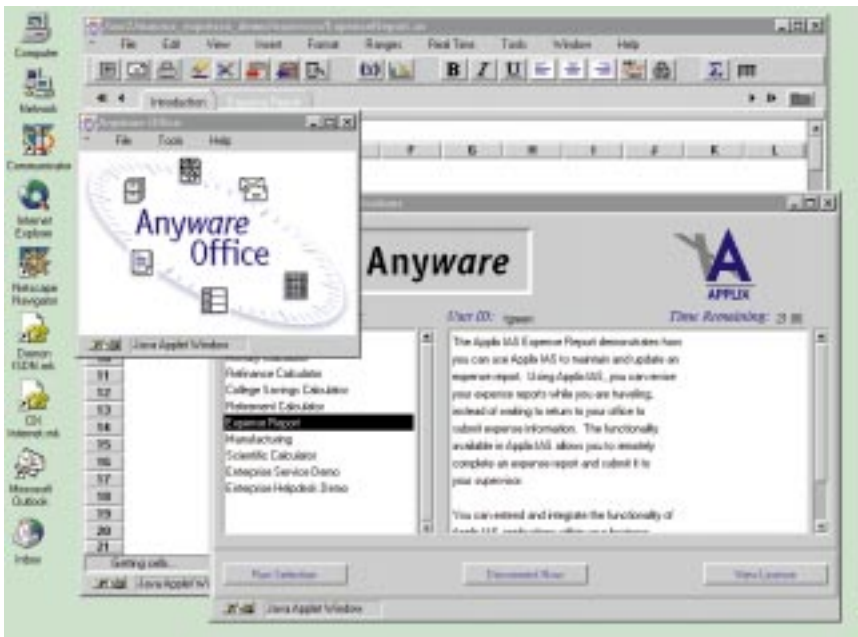
Only the rise of Windows in the early nineties provoked a level of debate in the computer industry to rival that now swirling around Java and Network Computers as the millennium approaches. In reality, it's the same debate: what is required to run an application?

With Windows, the issue was the applications interface. With the NC it is the resource required to support the interface. Network computing broadens the market for computing because it enables processing to be distributed in a more granular format than Windows. This enables useful application services to be delivered on devices down to SmartCard format.

Keeping it simple

Making network clients more functional means making the network more intelligent, which in turn reduces the client processing requirement and leads to the thin client. Contrary to widespread belief, thin clients do not threaten Windows. We're not going to be able to run up a presentation on a SmartCard any more than we'll be able to slip a card-sized PC into a kiosk in order to check our email on the move. The traditional Windows client will continue to develop. As Bill Gates said at the 1998 Windows Hardware conference in March: "We need all the power to make the PC a simple device".

The major change driven by network computing is to the client/server model that replaced mainframes and terminals with intelligent PC clients and servers for file and print, messaging, and database *à la* NetWare and Windows NT. The two-tier client/server split works for smaller applications, but costs a fortune to scale up to the bandwidth and availability standards expected of mission-critical services.



Sony likes Java so much, it licensed the Applix Anyware thin-client Java development platform in order to build a global manufacturing workflow system

Then the internet changed everything, revealing platform-independent communications and a common user-interface that offered the prospect of standardised distributed applications. Under the open systems model all the lower layers, from the physical layer up through the transport and presentation layers, are common, leaving only the applications layer to be settled. At a stroke, an enormous proportion of the middleware was standardised and the three-tier architecture (browser client, web server, back-end database) that web applications display became possible for the first time.

Early summer Sun

In May 1995, however, Sun unveiled Java and this offers the possibility of a multi-tier, fully-distributed applications environment. Clients can range from thin to the fattest PC, and processing resources can be distributed so as to balance the load on the network and place processing as close to the data sources as possible.

At birth, Java was little more than a vehicle for animations on web pages. Three years on, it's a different story. Java 1.2 (due this summer) addresses user interface, performance, security, and printing deficiencies, and provides a component model, JavaBeans. Much Java development goes unnoticed because it happens behind the scenes within corporate networks, but Java's cross-platform appeal has attracted the consumer industry as well as business. Numerous digital TV set-top boxes are being developed with Java, and major consumer web sites such as Sony Online are heavily dependent on Java.

Sun is still in charge of Java but now it is being prepared, with broad industry support, for approval by the International Standards Organisation, probably within the next two years. Sun's current firm control of Java is often maligned, but history shows that the rapid development of Java as a complete development environment encompassing embedded to enterprise solutions would not have occurred under a committee. Java, like Windows, is being developed under strong central control. Unlike Windows, it is being developed as a cross-platform environment from the start.

Windows might have provided a distributed applications environment, but until recently the Microsoft approach has been to exclude competition and become ever more Intel-orientated. Microsoft envisaged everything coming into and leaving the network going through Windows NT, which itself was losing the cross-platform portability it started with and becoming almost entirely Intel orientated. As a further disincentive, it is still not possible to develop a single Windows application that runs cross-platform on Windows-only platforms like Windows 95, Windows NT and Windows CE.

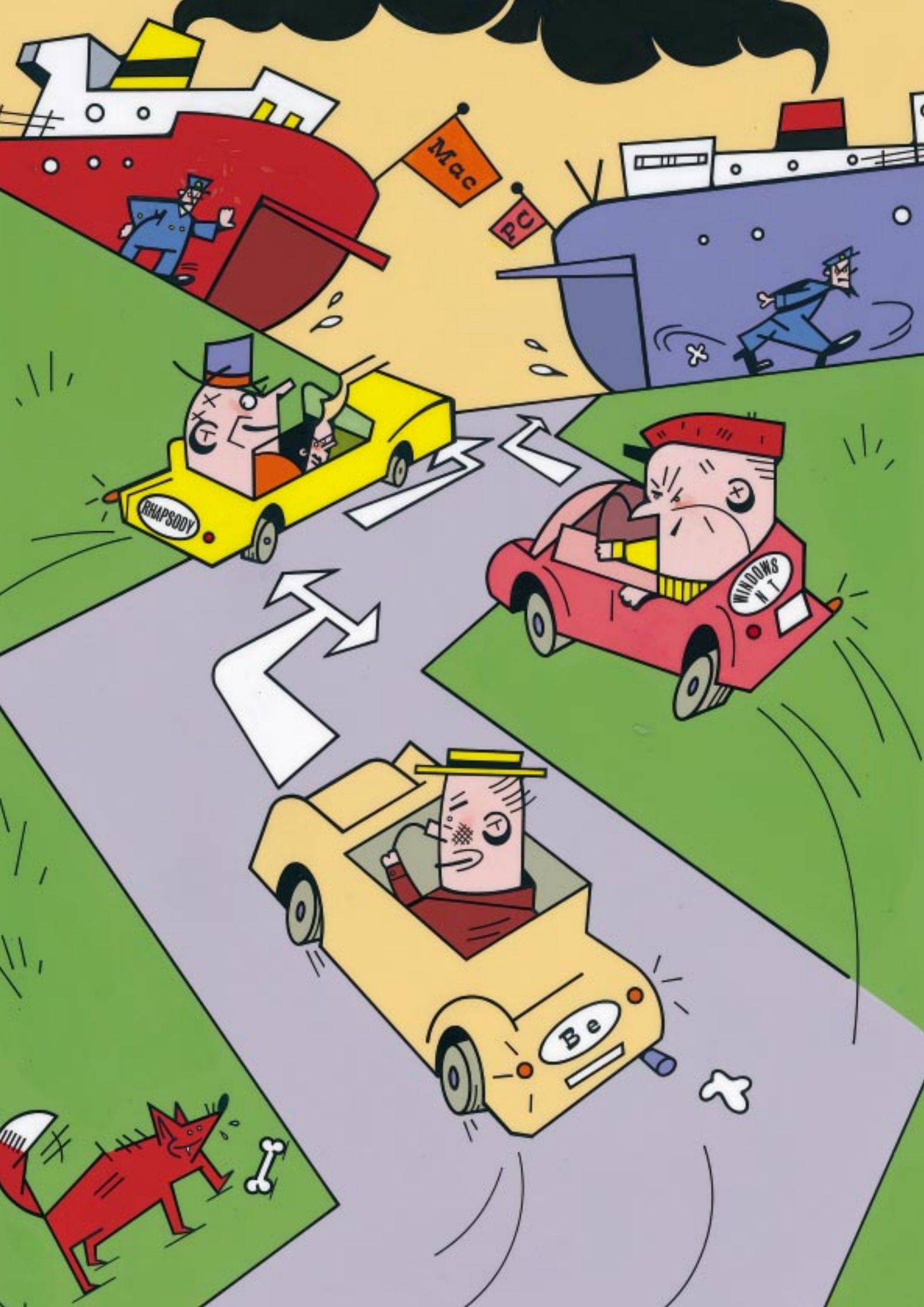
Here's to the winners

Java and NCs are often pictured as being in a battle for domination with Windows, and the number of NCs or the immaturity of Java are frequently put forward as evidence that Windows will win. The truth is that both will win because each complements the other and as a result the market grows larger. One only has to remember the transformation of Windows and Intel in 1997 and the consequent burgeoning opportunities for both, as well as for network computers — this change would not have happened without Java's impetus.

Eighteen months ago, Intel and Microsoft dismissed the NC, countering with the NetPC in March 1997. Nine months later, Intel had all but forgotten about the NetPC when it announced the Lean PC guidelines. In April this year, IBM announced that it was working with Intel to optimise JavaOS for Business to meet the compliance requirements of both the hardware-independent NC and the Intel-based Lean PC. JavaOS for Business is a pure Java package which IBM will offer to Intel OEMs together with Lotus eSuite.

Competition and opportunity

A year ago, Microsoft licensed Citrix technology and today we have Windows Terminal Server and Citrix MetaFrame enabling any device to access 32-bit Windows applications. Windows CE is shaping up as a processor-independent Windows platform competing against Java. Competition has expanded the opportunity. There is no battle to the death: Windows and Java will co-exist for many years. In competing against Java, Microsoft is doing what any responsible supplier should do to protect customer investments. As Bertrand Russell once said: "Change is indubitable... progress is a matter of controversy." ■


Mac
PC
RHAPSODY
WINDOWS NT
Be

BeOS in your bonnet

Although the innovative BeOS wasn't ready on time, so missing the boat in becoming Apple's new operating system, two years on, its arrival is still eagerly anticipated. And this time, it has been augmented to run on PCs too. Cliff Joseph checks Release 3.0 for any sting in the tale.

Be Inc. won't be a well-known name to most PC users. But about two years ago, it looked as though the Be Operating System (BeOS) might be the future of the Mac.

Among the various crises that Apple has been through in recent years was the failure of Copland, a new operating system that Apple hoped would replace the current Mac OS. Apple desperately needed a response to the success of Windows 95, so Gil Amelio, Apple's CEO at the time, began to look outside Apple for an alternative operating system. And, for a time, it looked as if the BeOS might be the answer to Apple's prayers.

Be Inc. was founded by Jean-Louis Gassée who had been a top executive at Apple only a few years earlier. Gassée's plan was to develop a new operating system that was designed specifically to cope with the demands of the new media that were just becoming popular: digital video, 3D graphics and high-resolution digital images.

Apple's core users tend to be creative types working in just these fields, so Apple and Be looked like a marriage made in heaven. Rumours about an Apple takeover of Be flew around for a few months; then, to everyone's surprise, Apple went and bought NeXT Software instead. The reason for this decision was simple. Apple needed a new operating system in a hurry, but the BeOS was nowhere near finished. However, NeXT's OPENSTEP operating system provided many of the same features and was a mature product that had been available for almost a decade.

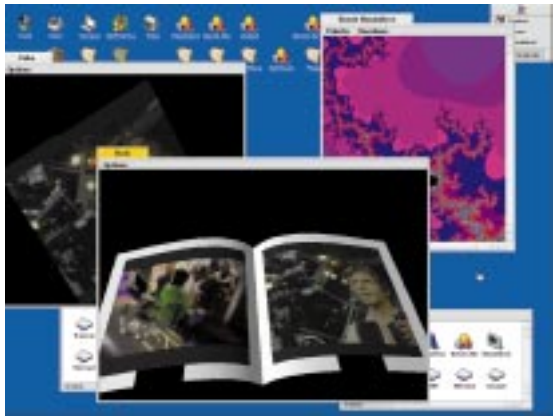
Sensible move

Having missed its opportunity to get a foothold in the Mac market, Be decided to produce an Intel version of the BeOS as well. This made sense, as PC users are moving into the graphics and video fields only to find that Windows isn't that well suited to this type of work.

An example of the limitations of Windows is its inability to cope with video files that are more than 1Gb in size. A gigabyte isn't much when you're dealing with high-quality video, so the BeOS provides a 64-bit file system that can support terabyte file sizes (1Tb = 1,000Gb). Power is also important for graphics and video work, and the BeOS provides better support for multi-processor systems than Windows 95, NT or the Mac OS.

Having an operating system that runs on both Mac and PC hardware has other advantages, too. Developers only need to produce one version of any Be application. If you develop an application using the BeOS running on a Mac, Be claims that you can recompile the application to run on the PC version of the BeOS in just a few hours.

It all sounds very impressive, and demos of the BeOS suggest that it lives up to Be's claims. There's one small catch, though. Apple chose NeXT instead of Be because the BeOS wasn't finished. Two years later, the BeOS still isn't finished. The current version is called Release 3, which might suggest that this is version 3.0. In fact, Be openly admits that Release 3.0 is "for geeks, enthusiasts and the curious only", and that it is "not yet a complete operating system".



Above The BeOS was specifically designed to cope with new media such as 3D and video **Left** Its underlying architecture is different, but on the surface, the BeOS looks very much like the MacOS

Installation problems

This became obvious when we tried to install the software. We were unable to install it onto either of our test PCs (both standard IBM Pentium systems) due to hardware incompatibilities. Installation onto a PowerPC-based Mac was more straightforward, although not without its problems. The BeOS was installed on a partition created on the Mac's hard disk, but its file-management system was unable to write to the primary Mac partition or copy files onto floppy disk. This meant there was no way for us to transfer files between the two

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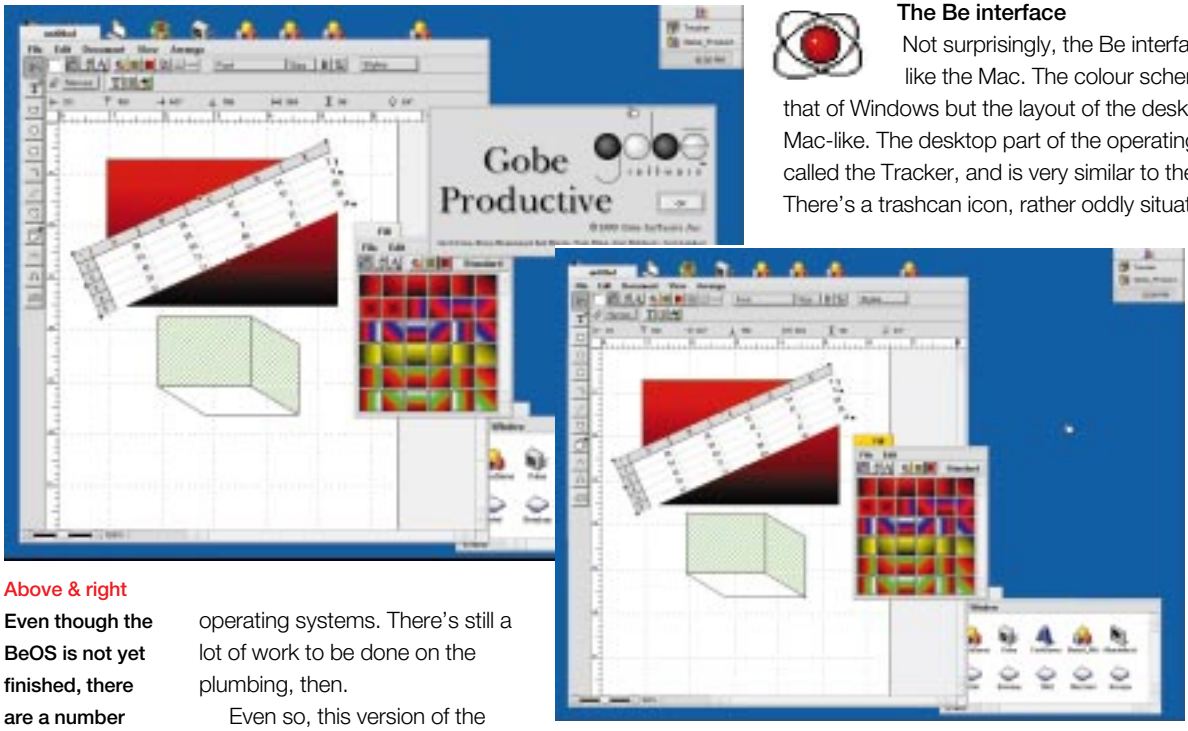
ILLUSTRATION BY: Kevin O'Keefe



Above & right **Even though the BeOS is not yet finished, there are a number of basic productivity programs already available for it**

operating systems. There's still a lot of work to be done on the plumbing, then.

Even so, this version of the BeOS is quite stable and allowed us to run a few of the applications that have already been developed for it — enough for us to assess the basic look and feel of this innovative new operating system.

The Be interface

Not surprisingly, the Be interface looks a lot like the Mac. The colour scheme is similar to that of Windows but the layout of the desktop is very Mac-like. The desktop part of the operating system is called the Tracker, and is very similar to the Mac's Finder. There's a trashcan icon, rather oddly situated in the top left corner of the screen, and alongside it is the Disks icon that you double-click to reveal the contents of your machine's various storage devices.

Over in the top right-hand corner of the screen is the Tracker menu which, just like the Mac's Finder menu, provides a pull-down list of all the currently open items on the desktop. The desktop file-

Be applications

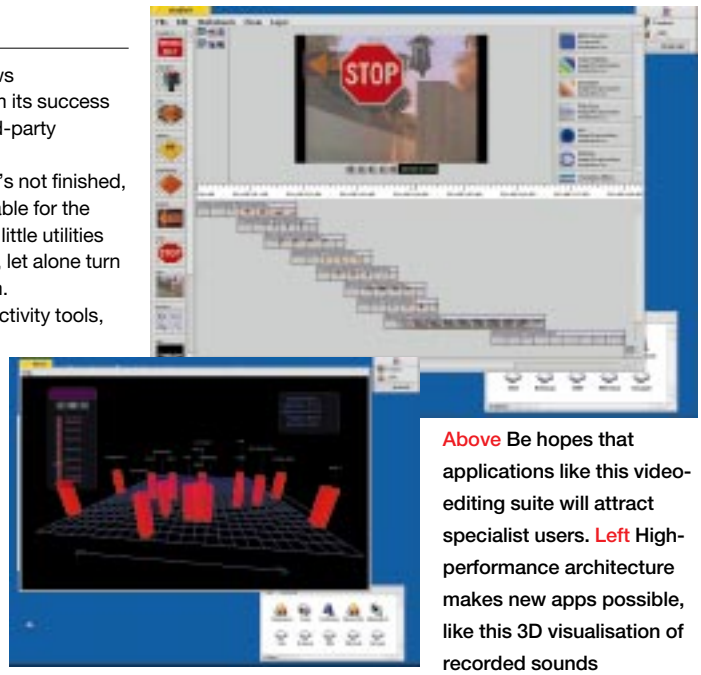
The BeOS cannot run existing Mac or Windows applications, so like any new operating system its success will depend on the quality and quantity of third-party applications that become available for it.

The outlook here is mixed. Even though it's not finished, there are hundreds of programs already available for the BeOS. The bad news is that most of them are little utilities that are unlikely to win over any new converts, let alone turn the BeOS into a mainstream operating system.

There's a decent selection of basic productivity tools, most notably Be Basics and Be Studio from BeatWare. Be Basics includes a word processor and a spreadsheet, while Be Studio provides bitmap and vector graphics editing tools. There are some interesting graphics and video software, like the recently released Adamation animation program. But there's still no sign of the killer app that could do for the BeOS what PageMaker and Photoshop did for the Mac.

It's also worth noting that the vast majority of Be software currently available only runs on PowerPC processors (i.e. on Macs). Very little of it has yet been converted to run on Intel hardware, although Be claims this is just a simple matter of recompiling the code. This reflects the fact that many Be developers come from a Mac background.

At one point there was work being done on a Mac emulator that would allow the BeOS to run Mac software. However, the company developing the emulator went bust and it's unclear whether any other company intends to continue the project. There's no sign of Windows emulators on the horizon, so PC users may have to wait a bit longer for that BeOS killer app to appear.



Above **Be hopes that applications like this video-editing suite will attract specialist users.** Left **High-performance architecture makes new apps possible, like this 3D visualisation of recorded sounds**

Wisely, Be is not attempting to replace the Mac nor Windows, but is instead aiming to complement them. The hope is that users will opt for dual-boot systems that can run the BeOS alongside an existing operating system. This will allow users to continue using their existing Mac and Windows software, while also giving them the option of running high-performance BeOS software when necessary.

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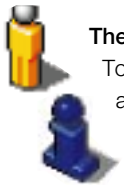
management system very much follows the style of the Mac. There's no equivalent of the Windows Explorer, and you gain access to all your folders and files by moving through multiple windows on the desktop.

Windows contain 3D icons similar in style to those used on the Mac, although it's fair to say that both Apple and Be copied these from NeXT in the first place. The contents of each window can be viewed either as a series of icons or as a list of items.

One element that is similar to Windows is that each window has its own series of pull-down menus in its title bar. This allows you to switch between icon and list views, and to display or hide attributes such as file size. You can close windows by clicking the "close" box in the left-hand corner of the title bar, and there's a nice little touch in the resize button that shrinks or enlarges the window to exactly the size needed to display its contents.



The architecture

To be honest, the BeOS interface is functional and visually attractive but offers nothing particularly new. It is the underlying architecture that makes it special. In addition to its 64-bit file system and multi-processor support, the BeOS makes efficient use of multi-threading. This allows you to open multiple copies of any file or application with which you want to work. Each copy is contained in its own "thread", and these threads can communicate dynamically with each other.

The BeOS has a built-in web browser and support for TCP/IP

Reflecting changes

Suppose you are editing a high-resolution image in a program such as BeatWare's Be Studio (*see box, "Be applications", p130*). You could have a normal-sized copy of the image in one window, and a magnified view of one section of the image in a second window. You could use the magnified view to perform finely detailed editing, and any changes you make will automatically be reflected in the normal-size view in the adjacent window, allowing you to see the effect of your changes as you go along.

Time and tide

Features like this will hold obvious appeal for designers and other content developers. As the saying goes, it'll be nice when it's finished. The problem, of course, is that it is still not finished and Be is not committing itself to a shipping date for the completed software. Time could be crucial to Be's chances of success. Microsoft has its eye on the content creation market and it is already making inroads with Windows NT. At the same time, Apple is close to completing Rhapsody, the new operating system based on the OPENSTEP software which Apple chose over Be two years ago.

Even so, the content creation market is on the verge of an explosive expansion. In the future, all TV, video, graphics and audio content will be digital, and the digital media marketplace will be more than big enough to support specialist niche players like Be.

So who knows? The BeOS operating system has a lot of advanced technology under its bonnet, and there is certainly a big market waiting for it. All they have to do now is get around to finishing it. ■

Table of Features

	BeOS Release 3	MacOS 8.x	Windows 95
Hardware Requirements			
Processor (*see note below*)	PowerPC 601/603/604e, Pentium or Pentium II	PowerPC 601/603/604e/750	Intel 486 or above
Memory	16Mb	16Mb	16Mb
Storage	150Mb hard disk, CD-ROM	50Mb hard disk, CD-ROM	100Mb hard disk, CD-ROM
Graphics/audio	Limited — see www.be.com for latest details	Any Mac PCI or NuBus cards	Any Windows PCI or ISA cards
Supports TCP/IP	●	●	●
Multithreading	●	●	●
Multitasking	●	❍	❍
Runs non-native s/w in emulation	❍	● (Windows)	❍

Key: ● Yes ❍ No

** This refers only to the basic processor requirements. Although Be provides a list of compatible PowerMac systems, it does not guarantee compatibility with any specific Intel-based PC system.*

Sweet & low

Following its Cyrix acquisition, Brian Halla hopes to make his company, National Semiconductor, the top player in the market for low-cost PCs and tomorrow's "information appliances". Here, he gives Geof Wheelright a glimpse of the future.

Brian Halla is ready to ride the low-cost PC wave. Unlike some of his competitors, he is in a good position to do that, having been one of the first leaders of a major computer processor manufacturing company to already have done so. The 51-year-old chairman of the board, president and chief executive officer of National Semiconductor Corporation believes that, for once, he may have the jump on arch-rival, Intel.

Many industry analysts have criticised Intel for being slow to react to demand for lower-cost home and business PCs. It was not until April this year, for instance, that Intel announced its Celeron chip for "Basic PCs" (*see box, "Intel Celeron Processor", p136*). Halla says he foresaw demand for this breed of low-cost PC and has pulled off a quartet of major acquisitions over the past two years to prepare National Semiconductor to take advantage. Halla says that as a result of these acquisitions, his company, which enjoyed revenues of $2.5bn in 1997, is now better able to benefit from what he suggests will be a vast market for computer processors that offer a complete "system-on-a-chip".

A chance with Cyrix

Vital to this strategy was National Semiconductor's acquisition last year of PC chip-maker Cyrix. This purchase has given National Semiconductor a strong chance to better compete against Halla's former employer and current arch-rival, Intel. Early evidence of this improved competitive position came in January when the company announced that it had successfully produced functioning Cyrix 6x86MX processors on 0.25 micron process technology at a pilot manufacturing facility in California. Simply put, it means that National Semiconductor is now positioned to begin manufacturing "state of the art" Intel-compatible computer processors this summer which, it claims, will offer performance comparable to flagship Intel's Pentium II.

While Cyrix has been producing Intel-compatible chips for years, it has always been hampered by the fact that it did not own its own chip manufacturing plants. This limited the speed with which new processors could be brought to market. It meant that Cyrix needed to book capacity at the chip "foundries" of other semiconductor makers, and it limited the amount of proprietary design that could be carried out, since Cyrix had to design something that it was sure other foundries could manufacture on its behalf.

Now that Cyrix is owned by National Semiconductor, which can provide it with "home-grown" manufacturing capacity to complement existing foundry agreements with key players such as IBM Microelectronics, the company can take a much more aggressive stance on both performance and "time to market".

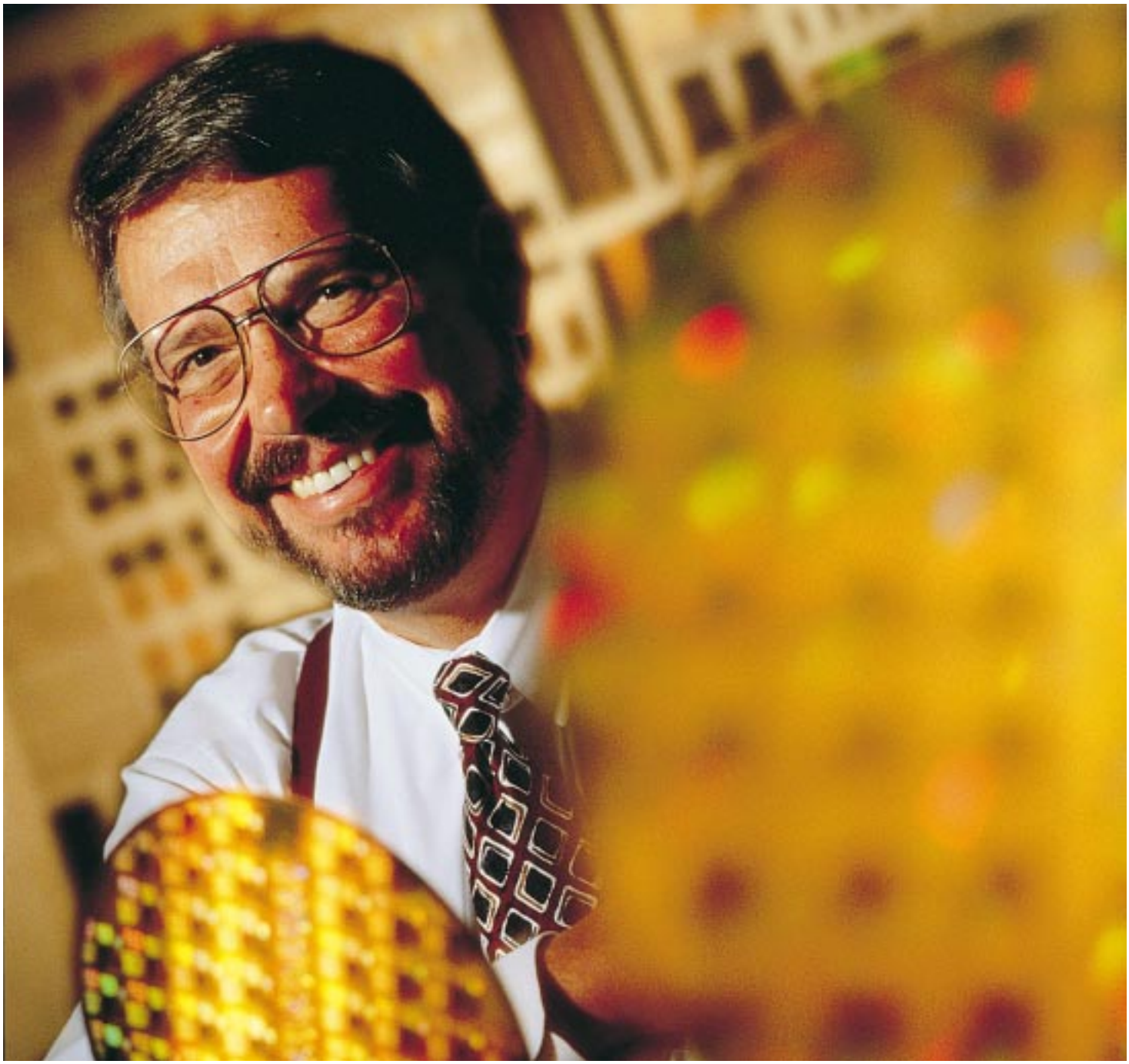
National Semiconductor expects to continue its foundry agreement with IBM Microelectronics, which is currently making the Cyrix 6x86MX. In addition, the company states that it also has agreements in place with foundries in Asia to make 6x86MX chips. National Semiconductor suggests that available capacity for the Cyrix processor is expected to be well in excess of ten million units in 1998.

By using this 0.25 micron design, the company says it has achieved a major breakthrough over previous technologies, reducing the chip size from 150sq mm to 88sq mm. (A micron is about 1/25,000 of an inch, making the circuits on this design about 200 times smaller than the width of a human hair.) Smaller "line widths" on the circuits should allow National Semiconductor to increase revenues by squeezing more chips onto every wafer produced.

Smart moves

According to Halla, this chip also gives his company an edge in the market for low-cost PCs. Industry figures suggest that about 40 percent of the desktop PCs sold in the US in the final quarter were in the sub-$1,000 category, yielding a growing market opportunity for Halla. "The architectural design, compact size, and low power consumption [of the 6x86MX chip] make it ideal for the rapidly-growing sub-$1,000 and $1,500 mid-range desktop PC marketplaces," he says.

Halla suggests, though, that the longer term opportunity is for devices that go well beyond today's standard processors and include everything from sound to optimisation for playing downloaded videos. Many of these functions are already included in the Cyrix



Brian Halla is confident that National Semiconductor will rise to the challenges that lie ahead. Wherever there's a PC, he believes, his "system-on-a-chip" will be behind it

processors that have been quietly stealing market share from Intel in the sub-$1,000 home and small business market. These are used by market leaders like IBM and Compaq in some of their latest systems. He predicts that in the near future, this "system-on-a-chip" will be in huge demand as a key component of a new range of "smart appliances", the market for which Halla suggests might be at least as big at today's desktop PC business.

The Cyrix acquisition was a key part in trying to make that dream reality. But up until the time the deal was announced in July last year and then until it received final approval four months later, Halla had been worried that someone else would see the huge potential of Cyrix and scupper the deal with a better offer. "Timing was so perfect that I was nervous right up until the deal closed that someone would try and steal it [the deal] out from under us," he says, suggesting that arch-rival Intel missed the boat in not preparing for the low-cost computer boom. "Intel got caught blindsided by the sub-$1,000 PC."

Strategic imperatives in the early hours

Now he says the challenge is the make the most of its new resources to stay ahead of the competition. "Our goal at National is to put a whole PC on a chip," Halla adds, explaining that he is very big on setting goals for both himself and his staff. In fact, Halla has made it clear that he wants everyone at National to know and understand exactly where the company is headed.

"At my first employee meeting, I said I wanted to be

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able to call any employee at two o'clock in the morning and ask them what the three strategic imperatives were and what the strategy was," he says. "There is no question in my mind now that every employee knows exactly what they are. I have to tell you I haven't done it at 2am, but I *have* done it, and there are an awful lot of employees who are ready to be called at 2am."

Three degrees

Halla's "three strategic imperatives" for the company are to use state-of-the-art process technology, achieve world-class manufacturing, and a six-month "time-to-market" methodology. The goals are as much strategic aims for National as they are the product of lessons learned by Halla before taking up his current post. He joined the firm in May 1996, having spent eight years with LSI Logic Corporation and, previously, a number of years with National Semiconductor nemesis, Intel.

In his first year at National Semiconductor, Halla made major changes to the company in order to focus on his "system-on-a-chip" strategy. He also worked to revamp process technology and manufacturing, and "fast-tracked" the opening of a new 8in wafer facility in South Portland, which ran its first 0.35-micron wafers in May 97. The plant is designed to move quickly to the next generation of the aforementioned 0.25-micron technology.

The invisible PC

National is developing other system chips to power what he says will be a "broad range" of information appliances. "First the PC goes on a chip," says Halla. "Next, the PC becomes a plug-in behind the dashboard of your car, behind a flat-panel display in your kitchen, or inside a set-top box. The PC disappears just the way electric motors are invisible in our lives. We use them all day long, but we only think about the appliance, not the motor. Nobody knows how many RPMs drive their coffee grinder and nobody will care how many megahertz power their DVD player."

The company's approach to system-level integration employs on-chip distributed processing, in which different parts of the chip are optimised to perform specific functions like multimedia or communications, as opposed to running every function via a single premium-priced processor. "Assigning the tasks to specialised engines is the smart way to provide great performance at reasonable cost," says Halla.

Core plan

Critical to the project is National's reusable cores methodology, which allows its design engineers to shorten time to market by drawing from a library of functional, or core, building blocks such as processor, input/output, graphics, video decompression, power management, network and audio to create the final product. The cores are designed to specifications that make them interchangeable depending on customer requirements. For the first implementation, all the major PC functions, except for memory and high-voltage parts of the power supply, will be integrated on the chip.

As to the challenges that lie ahead, Halla sounds ever-optimistic; particularly so as he looks at the increased numbers of devices that are likely to have a PC at their core. Whatever it is — it may not even have been invented yet — Halla believes his "system-on-a-chip" will be the processing engine that drives it. ■

Processors for low-cost PCs

There will be many low-cost Pentium PCs on offer in the coming months.

This prediction follows the announcement by Intel in late April that it would immediately begin shipping a successor to the Pentium in the consumer PC market, and pushing the Pentium II processor in the PC enthusiast, corporate desktop and server markets.

For most consumers, the big news will be the arrival of the Intel Celeron processor operating at 266MHz which the company now says will be used in "Basic PCs" that typically sell for under $1,000 in the US. The company also claims that Intel Celeron processors will deliver better overall performance than the Pentium processor with MMX technology which is offered in most low-cost PCs today.

Intel has long been looking for a way to stop the cannibalisation of its business-sector sales by consumer PCs. And it seems to think that having a processor dedicated to the consumer market and optimised for consumer applications, is the way to achieve this goal.

"Intel's goal is to deliver the best products for each segment of computing," explains Paul Otellini, executive vice president, Intel Architecture Business Group. "Pentium II processor-based systems bring the highest levels of performance and functionality to business and consumer users, while Intel Celeron processor-based PCs deliver the quality, value and compatibility that users expect from Intel."

The Celeron is based on the same P6 micro-architecture as existing Pentium II processors but with the Level 2 cache removed. The Celeron processor is supported by the Intel 440EX AGPset, which Intel says is the first AGPset designed specifically for this "basic PC" market segment.

Intel's Celeron was barely out of the starting gate when National Semiconductor responded to it with a new Cyrix chip. On 14th April, the company unveiled the Cyrix M II99-300 processor. It claims that its chip offers "no-compromise" Pentium II-class performance and features that make it a "superior solution" for the entry-level PC market.

Intel further cites independent testing which supposedly indicates that performance of the M II99-300 processor is up to 25 percent higher than that of the Celeron 266MHz, on systems with equivalent configurations. Additionally, Cyrix claims that the M II99-300 processor delivers industry-standard benchmark scores in the same range as the 300MHz Pentium II.

"Our newest processor enables workstation-class performance at entry-level prices," boasted Halla in announcing the chip. "Others may try to 'decelerate' and devalue the performance of entry-level systems, but we believe customers are smart enough to figure out that game and demand higher performance. Systems using the M II99-300 processor do not compromise on features or performance. In fact, using the Cyrix M II99 processor enables OEMs to make a higher profit in the entry-level PC market. This means consumers get the state-of-the-art performance and features they want at a very affordable price."

Grand design

Just what kind of kit can you get for just under £1,000? Something quite good, as these PII PCs show. Tested and reviewed by Paul Trueman.

PC prices have been falling faster than an asteroid on its way towards Earth, and it makes for sobering reading to flick through back copies of *PCW* and see what £999 (ex VAT) could have got you a year ago. If you were in the mood to empty your wallet to the tune of a grand, chances are you'd have ended up with a P133 with 16Mb (32Mb if you were lucky) and maybe a 2Gb hard drive. But today, the PC industry is involved in a savage price-cutting war about which nothing is certain, other than the consumer is on the winning side — at least, so far.

Eager to see just what dream PC packages were out there, we rounded up ten machines, setting a price limit of £999 (ex VAT). But we deliberately left the technical specifications open, letting the vendors make their own choices on what components to include.

We simply made two requests. The first was that the monitor size should be fixed at 15in, to stabilise the cost of the overall system and concentrate on the PC systems themselves. We were also particularly interested in the recent phenomenon of plummeting PII prices, so our other specification was that the PCs must use a PII processor.

We were expecting some high-powered systems, but were genuinely impressed by the processing power of some of the machines we received. In April, Intel announced its brand new PIIs running at 350 and 400MHz, but even the relatively high price of these processors didn't stop one of the companies in this group test putting a 350MHz chip in its PC.

Who needs to spend £2,000 to get the latest and greatest kit? Just read our group test and you will see for yourself what sort of high-end punch-per-pound performance our ten companies rustled up for around a grand.

£999 PIIs Contents

Ratings

★★★★★	Buy while stocks last
★★★★☆	Great buy
★★★☆☆	Good buy
★★☆☆☆	Shop around
★☆☆☆☆	Not recommended

ILLUSTRATION BY Amanda Hutt

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Avontech PII 266

Avontech is a relatively new company, founded in 1994 and based in Bristol. Although its core customers are mainly corporates and government departments, it has recently begun to sell to individual home users.

The Avontech PC had a PII 266 processor, rather than the 300 and 333MHz processors supplied in other machines, but it still performed well in the SYSmark test compared to PCs with more powerful specifications. The AL440LX Intel motherboard had plenty of room for expansion, partly as a modem was not included, and on-board sound was provided by the Yamaha OPL/4 chip, leaving two ISA and four PCI slots free.

Anyone looking to upgrade RAM would be pleased to note that all 64Mb of SDRAM was on the one slot, although it might be necessary to disconnect the IDE ribbon from the socket adjacent to the DIMMs, as it made it difficult to get at the other two free DIMM slots.

Avontech had opted for a graphics card we hadn't seen before, a 4Mb Micro Star MS-4415 using a Cirrus Logic chip. We weren't overly impressed by its scores in the Final Reality test and, although its processor was running at a lower clock speed than other PCs in the test, other 266MHz models produced better 3D test results.

This was one of the widest PCs we saw, and it took up rather a lot of room on the desktop. It did seem well built though, with a sturdy case, and all connections and wires inside were neatly taped up. A helpful guide on the rear of the case helps you to get the right connections into the right ports.

The same attention to detail in the build quality wasn't carried through to the presentation of the accompanying documentation, though. Our manuals were collected in a static-free bag, and there was no accompanying software other than Windows 95. We weren't expecting large software bundles, but the absence of anything but the operating system reflects Avontech's corporate background. On the other hand, the Zytec speakers supplied were excellent: 64W with a deep, clear sound.

PCW Details

Price £1,175 (£999 ex VAT)
Contact 01275 462260 www.avontech.co.uk
Good Points Good build quality. Upgradable.
Bad Points Unimpressive 3D card. Poor presentation of documents.
Conclusion A decent machine outgunned by its rivals.
Build Quality ★★★★★
Performance ★★★★☆
Value for Money ★★★☆☆
Overall Rating ★★★☆☆

Brother Professor 971

We were surprised by how many desktop PCs we received in this group test, and Brother was one company who opted for this design.

The Professor 971 came with one of the best software packages of any we saw, with a whole raft of Microsoft goodies from Encarta 98 to Works 4.5.

Unfortunately, this was the only element of the overall package in which the Brother could be said to excel. It was under-specced in almost every component when compared to most of the other PCs in this group test. It had the lowest-clocked processor, a PII 233, and it was the only one not fitted with 64Mb of SDRAM, making do with just 32Mb. This, combined with the slower processor, meant the Brother scored worse than its rivals in the office applications SYSmark test.

It was the only PC in the test to have a PCI graphics card rather than an AGP card. The motherboard had a single AGP slot, although Brother had opted to fit the system with the PCI version of the ATi 3D Rage Pro II (*see box, page 148, for details*). It's no coincidence that the Brother scored badly on the 3D Final Reality tests.

If we were worried about the low specification of most of the components, our fears were hardly allayed by the 3Gb hard drive fitted inside. 4Gb worked out as the standard in our group test for this price point, with some companies offering 6Gb hard drives — double the Brother's capacity.

The build quality wasn't in question, the manuals were well written and provided plenty of technical support, and there was a full set of drivers in the box. But the low specifications of this PC let it down badly, both on the tests and in comparisons on value. For £1,000 Brother is offering consumers Last Year's Model.

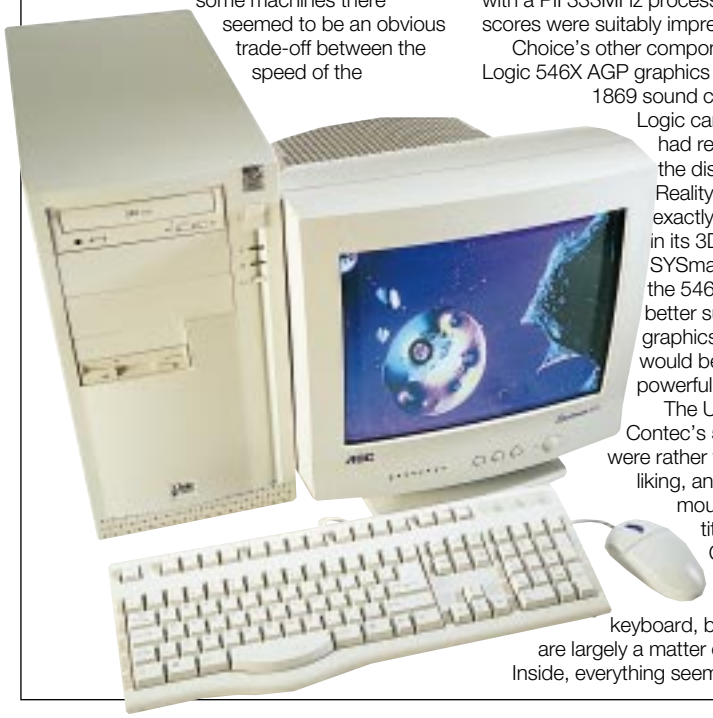
PCW Details

Price £1,175 (£999 ex VAT)
Contact Brother 01275 462260 (no URL)
Good Points Excellent software.
Bad Points Shame about the rest of it.
Conclusion Last year's model.
Build Quality ★★★★☆
Performance ★★☆☆☆
Value for Money ★☆☆☆☆
Overall Rating ★★☆☆☆

p145 ➢

Choice Systems Ultra

Choice sent us its promisingly-named Ultra: a short, wide tower case housing a 4.3Gb Maxtor hard drive as well as the ubiquitous 64Mb of SDRAM. With some machines there seemed to be an obvious trade-off between the speed of the processor and the quality and quantity of other components. The Choice PC was a good example of this, and while the company had not fitted a modem, the Ultra was fitted with a PII 333MHz processor and its SYSmark scores were suitably impressive.



Choice's other components were a Cirrus Logic 546X AGP graphics card and an ESS 1869 sound card. The Cirrus Logic card was not one we had reviewed before and the disappointing Final Reality scores didn't exactly breed confidence in its 3D abilities. The SYSmark scores show that the 546X is probably a card better suited to 2D graphics, and that the Ultra would be a good bet for a powerful office PC.

The Ultra comes with Contec's 50W speakers that were rather too tinny for our liking, and the impressive mouse from the aptly-titled Cool Mouse Company. We weren't so keen on the deep, spongey keyboard, but then, peripherals are largely a matter of personal choice. Inside, everything seemed to have been put together with care and there were some nice touches, like the plastic grip ensuring that the AGP card stayed in place. All the ribbon cables were neatly taped out of the way, and there was plenty of room to upgrade, with two free 5.25in bays and one free 3.5in bay.

Choice had minimised the size of the case by positioning the power unit vertically over the motherboard, rather than horizontally above it, adding inches onto the tower-case size. While this saves desktop space, it lends the interior of the case a somewhat cramped feel and hampers access to the SDRAM modules. If you wished to remove the processor, for example, you would have to take the power unit out first.

The exterior was attractive, with power and hard-drive indicator lights neatly refracted through triangular, transparent plastic.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Choice 0181 993 9003 www.choice.co.uk
Good Points Well-built machine with a powerful processor.
Bad Points Poor graphics capabilities.
Conclusion Good performer for 2D applications.
Build Quality ★★★★☆
Performance ★★★☆☆
Value for Money ★★★☆☆
Overall Rating ★★★☆☆

Dan Dantum II/W5

Personal Computer World Editor's Choice

We were impressed by this PC as soon as we saw what Dan had put into it. It was one of the few in the test to include more than a spartan set of components, being kitted out with both a modem and a 64-bit sound card and with quality components throughout.

We were rather puzzled on first starting up, as pressing the power button seemed to have little effect. We quickly realised that this was because InstantON had been enabled in the BIOS, although this is not how Dan normally configures its PCs.

When we opened the Dan up we were impressed by the neatness and order of the innards, although we did find a CD audio cable that was detached from the CD-ROM. Sound was provided by the excellent Creative Labs AWE-64 sound card, and another ISA slot was filled with a Pace 56K modem. This modem was Editor's Choice in our last modem group test, and a flash upgrade to the new V.90 standard will be available in September.

That left one ISA slot free, and all four PCI slots were free too — handy if you want to upgrade. The AGP slot was taken up with ATi's Xpert@Work which uses a 3D Rage Pro chip. (*For more on graphics cards, see page 148.*)

The 64Mb of SDRAM was contained on a single DIMM memory module, leaving one slot empty should 64Mb prove insufficient.

The Dan also had a very generous 6.4Gb hard drive, 2Gb larger than the 4Gb drives supplied by most manufacturers in this test. Despite having only a PII 266 processor, this PC outperformed other higher-clocked machines, scoring impressively on both the Final Reality 3D test and the SYSmark test.

As well as being one of the few PCs to provide a modem, Dan also included a considerable software package — Lotus SmartSuite97, as well as the DTP package, Serif PagePlus 3. The documentation supplied was also first-rate, with manuals and drivers that covered everything from the Super P6SLA motherboard to the Atapi CR-586B CD-ROM drive.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Dan 0181 830 1100 www.dan.co.uk
Good Points Excellent all-round configuration.
Bad Points We couldn't find any.
Conclusion A winner.
Build Quality ★★★★☆
Performance ★★★★★
Value for Money ★★★★★
Overall Rating ★★★★★

p148 ➢

Graphics cards

The graphics card is a vital part of a PC system. Together with the monitor, it underpins the quality and speed of the picture you see on your screen. In an industry used to rapid development and change, the graphics-card sector is perhaps the most bewildering: the sheer amount of new hardware, specifications and standards can leave even the most enthusiastic watcher bemused. Here is a quick guide to some of the most common terms.

2D, 3D and 2D/3D

The difference between 2D and 3D graphics is pretty obvious: 2D is flat, like an office application, while 3D has depth, giving the impression of going into your screen, as in games like Quake. In addition to supporting three dimensions, 3D cards allow developers to include special effects like fogging, translucency and reflections, which help to make the 3D environment more realistic and immersive. 2D/3D cards can handle both types of graphics, while 3D cards work alongside an existing 2D card.

AGP

New Pentium II-based PCs can use AGP (Accelerated Graphics Port) cards which sit in a different slot to the old PCI cards. This allows the graphics card much faster access to the computer's main memory, allowing larger textures to be used and making the 3D graphics more detailed and realistic.

DirectX

This is Microsoft's standard for 3D graphics. If your graphics card supports DirectX, it will run any game written using DirectX. The latest version, DirectX 5, has been criticised for being unnecessarily slow and not supporting the full features of many graphics cards. This is why you often see versions of games modified specially for particular 3D cards. There have been hints that DirectX 6 — just around the corner — will address these problems, leading to far better 3D performance.

OpenGL

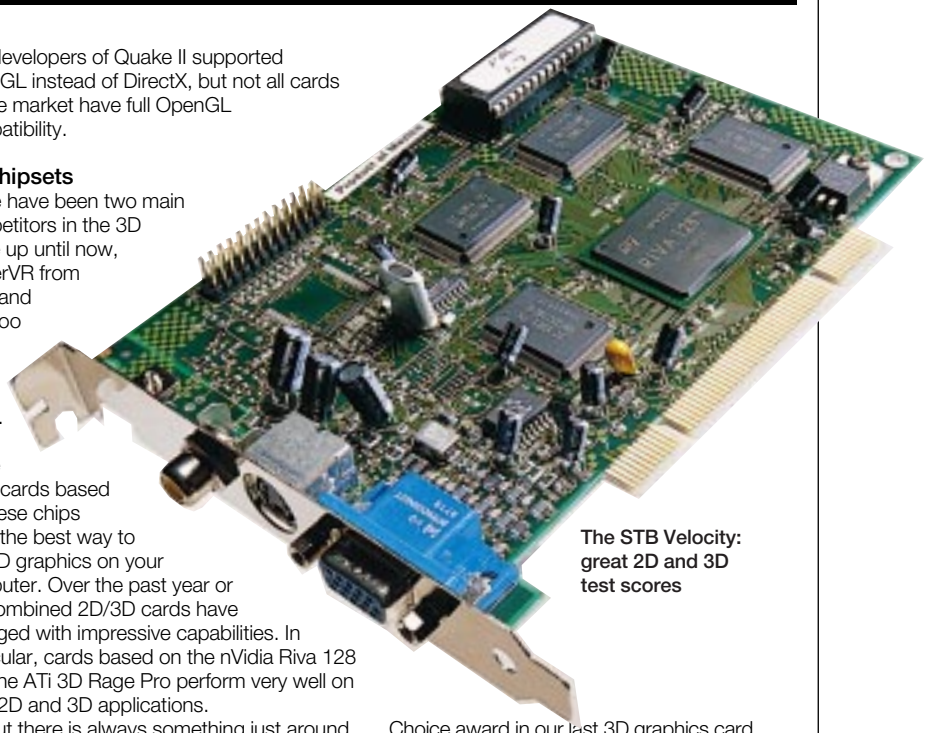
A competing standard in the world of 3D graphics which some developers believe is faster and better than DirectX.

The developers of Quake II supported OpenGL instead of DirectX, but not all cards on the market have full OpenGL compatibility.

3D chipsets

There have been two main competitors in the 3D battle up until now, PowerVR from NEC and Voodoo from 3DFx. For some time, cards based on these chips were the best way to get 3D graphics on your computer. Over the past year or so, combined 2D/3D cards have emerged with impressive capabilities. In particular, cards based on the nVidia Riva 128 and the ATi 3D Rage Pro perform very well on both 2D and 3D applications.

But there is always something just around the corner, and new, more powerful versions of the PowerVR and Voodoo chipsets have just been announced by the manufacturers. The first Voodoo2 card is already on the market, courtesy of Creative Labs, while PowerVR II cards are expected soon. Also imminent are a number of cards based on Intel's new i740 chip, which is designed purely for AGP graphics cards.



The STB Velocity: great 2D and 3D test scores

The cards

The ATi Xpert@Work is the probably the most commonly bundled 2D/3D graphics card in the systems we have reviewed over the last few months. It is something of a surprise, then, to see only two in this group test, used by Dan and Dotlink. There are some similarities between all the graphics cards, however. All are slot-in cards, as opposed to chips stuck on the motherboard, and all come with 4Mb of memory, apart from the 8Mb Matrox Productiva. As is more or less standard with Pentium II systems these days, almost all the cards are AGP, the only exception being the Brother.

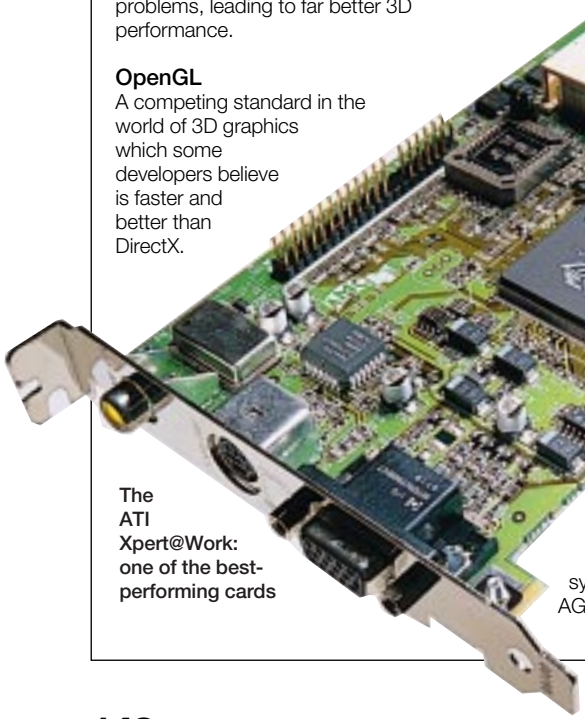
The ATi Xpert@Play won the Editor's Choice award in our last 3D graphics card group test (*PCW* December 1997). The Xpert@Play is essentially the same card as the Xpert@Work. It's a solid performer with a host of 2D and 3D features, and a TV tuner. Based on the 3D Rage Pro chipset, its 230MHz RAMDAC (speed at which it can process information) can output a maximum non-interlaced vertical refresh rate of 85Hz at 1,600 x 1,200 resolution, so you are well served no matter how big your monitor is. On the software side, an ATi icon on the Windows 95 toolbar provides easy access to both display and device settings.The other ATi cards in the group test are the AGP 3D Rage Pro fitted to the Viglen, and the PCI (non-AGP) 3D Rage Pro II in the Brother.

There are also two STB Velocity 128 cards, courtesy of Dell and Roldec. The STB claimed a Highly Commended award in our December 1997 issue, and it's easy to see why. Using the nVidia Riva chipset, it has a number of well-designed features. Right-clicking on the desktop lets you change the resolution and colour depth from a comprehensive drop-down menu, and zoom, virtual desktop and multiple desktop are supported.

The other cards which feature in the group test are the Microstar MS4415, using a Cirrus Logic chip, and fitted to the Avontech machine; the SiS 6326 card in the Mustard PC; and the Cirrus Logic 546X card in the Choice. These cards are produced by manufacturers better known for making on-board chips for budget PCs and notebooks. None were impressive performers, and it might be worth paying a little more and specifying a well-known brand of card.

The only 2D card in the test is the brand-new Matrox Productiva, fitted in the Mesh PC. As a 2D card it did badly on our Final Reality tests, which are predominantly 3D orientated, although it did well in the SYSmark 2D office applications test.

Adam Evans

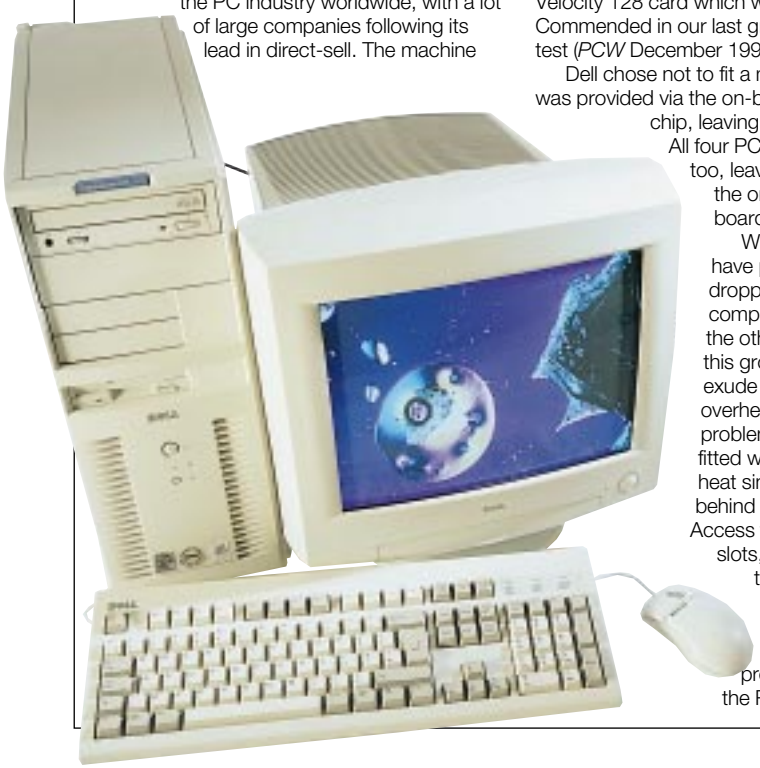


The ATI Xpert@Work: one of the best-performing cards

p150 ➢

Dell Dimension XPS D300

Dell has seen its sales and stock soar in the last year, and after a successful 1997 it is the third largest company in the PC industry worldwide, with a lot of large companies following its lead in direct-sell. The machine Dell sent us is part of its Dimension range, with a 300MHz PII processor, 64Mb SDRAM, a 4Gb hard drive, and the impressive STB Velocity 128 card which was Highly Commended in our last graphics card group test (*PCW* December 1997).



Dell chose not to fit a modem, and sound was provided via the on-board Yamaha OPL3 chip, leaving both ISA slots free. All four PCI slots were empty too, leaving the AGP slot as the only one filled on the board.

While Dell might not have produced a jaw-dropping spec in comparison with some of the other companies in this group, its PC did exude quality. Processor overheating shouldn't be a problem, as the PII 300 is fitted with a large metallic heat sink, and a fan is fitted behind it just in case. Access to the three DIMM slots, two of which were taken with the 64Mb, was unfettered by cabling, so you shouldn't have any problems adding to the RAM. All the ports were clearly marked and the sound sockets colour-coordinated, while the IDE cables were impressively neat and ordered. The 4Gb hard drive was fixed flush vertically up against the front of the case, freeing up the 3.5in bay slung below the floppy drive.

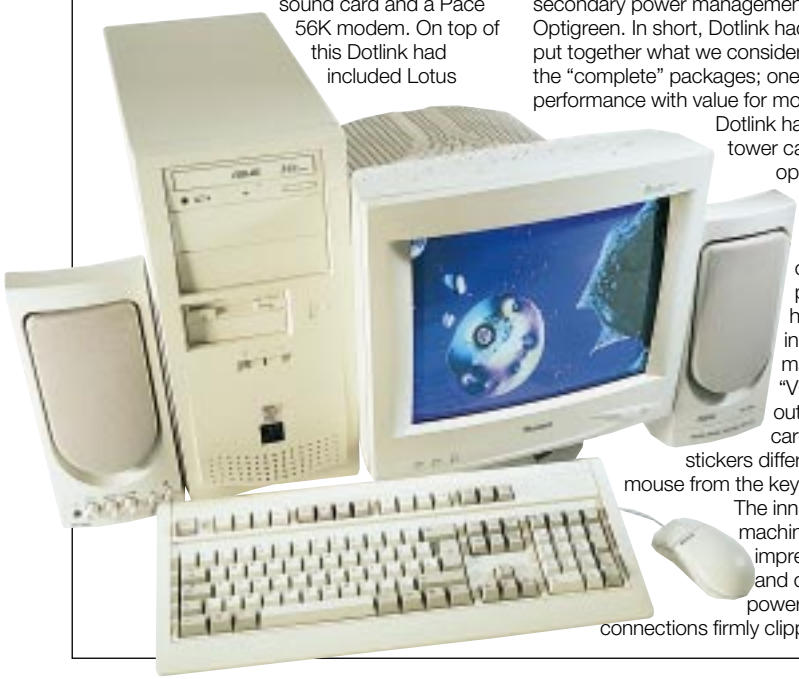
Dell ships MS Money and Works with the XPS D300. The operating system, in this case Windows 95, was part-installed so the user can configure the final settings to his or her own specification the first time they set up the PC and switch it on. This might not suit everyone, as reboots are necessary and the OS needs information from the CD, but Dell does include a guide to starting up for the technologically unsure.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Dell 0870 1524850 www.dell.co.uk
Good Points Good software. High-quality build. Good components.
Bad Points The internet enthusiast might have wanted a modem.
Conclusion A shame that such a prominent company couldn't have put together something more exciting.
Build Quality ★★★★★
Performance ★★★☆☆
Value for Money ★★★★☆
Overall Rating ★★★☆☆

Dotlink Magnum II - 333 SE

We were immediately impressed by the configuration of the Dotlink PC. Not only did it have top-quality components — 64Mb of SDRAM, a 4.3Gb hard drive, an XPert@Work AGP card — but it also had a PII 333, Creative Labs' AWE-64 sound card and a Pace 56K modem. On top of this Dotlink had included Lotus SmartSuite97, and SuperVoice for Windows, a voice recognition package.



A few security utilities for the nervous user had even been pre-installed. Dotlink's Emergency Utilities allow the user to configure backup or emergency recovery, and there's a secondary power management utility from Optigreen. In short, Dotlink had managed to put together what we considered to be one of the "complete" packages; one that combines performance with value for money.

Dotlink had opted for the tower case design as opposed to the desktop chassis favoured by others. All the ports at the rear had been individually marked, from the "VGA" marking out the graphics card, to the PS/2 stickers differentiating the mouse from the keyboard ports. The innards of the machine were impressively neat and ordered, with all power and IDE connections firmly clipped out of the way of the RAM and processor. All four PCI slots were free of cards, with two of the three ISA slots filled with the 56K modem and the AWE-64 sound card. The 64Mb of SDRAM was contained on two DIMM modules, leaving one slot free for additional main memory. There is sufficient room for expansion in this PC, with two free 5.25in forward-facing drive bays, and room for one 3.5in drive slotted between the floppy and hard drive.

Such was the overall quality of the package, that we were a little disappointed by the JUSTer speakers that suffered from slight crackle even at low volume. The Dotlink scored the highest result in the SYSmark test, although its Final Reality score was something of a disappointment in comparison, especially considering that it had the impressive ATi Xpert@Work graphics card.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Dotlink 0181 902 5802 (no URL)
Good Points Great hardware. Powerful processor.
Bad Points Relatively disappointing 3D scores.
Conclusion Very impressive.
Build Quality ★★★★★
Performance ★★★★☆
Value for Money ★★★★☆
Overall Rating ★★★★☆

p152 ➢

Monitors

For this group test we asked that all ten companies submit 15in monitors, so that manufacturers were not torn between giving us a 17in monitor or more RAM and hard disk. With most 15in monitors, the optimum resolution is 800 x 600 pixels, at which you can expect refresh rates of up to 85Hz. While a non-interlaced refresh rate over 70Hz should give you a flicker-free display, VESA now recommends 85Hz. Good 15in monitors can provide similarly high refresh rates of 1,024 x 768, but at this resolution the details are too small to see comfortably. Many 15in monitors are unable to provide a sufficiently focused picture at 1,024 x 768, as we found time and again in this test.

There was only one monitor in the group test that we found unacceptable, and it was the **Ideal** monitor that **Mustard** included in its bundle. The 15in SA-564DM monitor was anything but ideal, with a dreadful loss of focus at 1,024 x 768 at 70Hz. While both refresh rate and focus improved at 800 x 600, it still had everyone reaching for the paracetamol. We have reviewed this monitor before, and our original advice still holds: don't waste your money.

The 15in **Acer** monitor supplied by **Dell** provided sharp focus and an 85Hz refresh rate at 800 x 600. When the resolution was upped to 1,024 x 768, the refresh rate fell to a disappointing 60Hz and there was a noticeable loss of sharpness.

Roldec had opted for an **ADi** 15in monitor, the Provista E40, which has a diagonal viewable area of 13.8 inches. The E40 was able to display a resolution of 1,024 x 768 at an excellent refresh rate of 85Hz, although there were minor focus problems. The focus was excellent at a lower resolution of 800 x 600. The E40 didn't have an OSD, but the manual controls were user-friendly.

Hansol supplied two of the companies in the group test, albeit with different models, and the differences showed. **Avontech** used an unbranded Hansol monitor that afforded a decent picture at 1,024 x 768, although with a refresh rate of only 60Hz non-interlaced. Dropping the resolution to 800 x 600 sharpened the picture and bumped the refresh rate up to 85Hz. We were much more impressed by the Hansol Mazellan 501P monitor that we received with the **Dotlink** system. It provided a crisp focus at 1,024 x 768, and could display this at a refresh rate of 85Hz as well as offering resolutions of up to 1,280 x 1,024 pixels, although this resolution can be too high even on a 17in monitor. The 501P was one of the few 15in monitors we saw to include OSD (On-Screen Display), although the controls were rather fiddly.

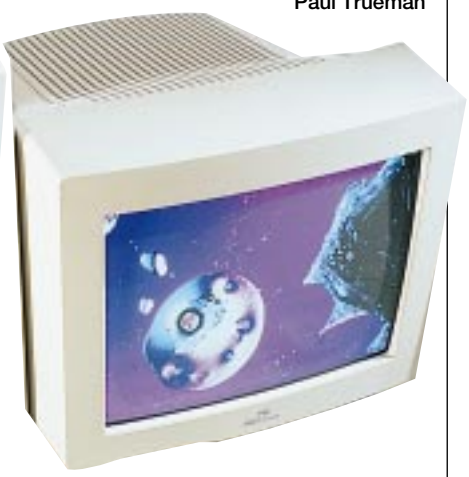
Taxan also supplied two companies in our test. **Mesh** had chosen the excellent Taxan Ergovision 550 to accompany its PC. Most of the 15in monitors we saw in this group test could display 800 x 600 with sharp focus, but the 550 had the sharpest focus of any monitor we saw at 1,024 x 768, and with an excellent 85Hz refresh rate. The 550 also had an impressive OSD that enabled the geometry controls to be altered. The other Taxan monitor, the BM 87 rebadged unit from **Brother**, could only muster a refresh rate of 60Hz at 1,024 x 768. At this resolution there was some loss of focus, and a barrelling effect. The refresh rate rose to 75Hz when the resolution dropped to 800 x 600, but there was still some loss of focus in the top two corners of the screen.

The Spectrum series of monitors from **AOC** has been around for years, and **Choice** had opted to use one of the latest additions to the family. The 5Vlr 15in monitor was impressive, one of the few we saw that could support a 1,024 x 768 resolution at a healthy 85Hz. It could also do 1,280 x 1,024, although only at a refresh rate of 60Hz, and such high resolutions with 15in monitors are rather pointless anyway as it requires a magnifying glass to make out anything on a 15in screen.

Viglen used the AX1595 from **Mag**, and the speakers attached to the side of the monitor. We were impressed by the OSD, with its user-friendly icons and responsive controls. The AX1595 could display resolutions up to 1,280 x 1,024 and so had no problems with a resolution of 1,024 x 768, and could produce it at a refresh rate of 85Hz.

The 1569SE **Dan** 15in monitor from **CTX** was one of the few in the group test that was as impressive as the accompanying PC system. It could display a resolution of 1,024 x 768 at an impressive 85Hz, while the 13.8in of viewable area remained sharp. An excellent OSD allowed the user to alter the screen's geometry, with user-friendly controls and an easily comprehensible display.

Paul Trueman



■ **Ten systems and ten different monitors — some impressive, and some that willl having you running for the painkillers**

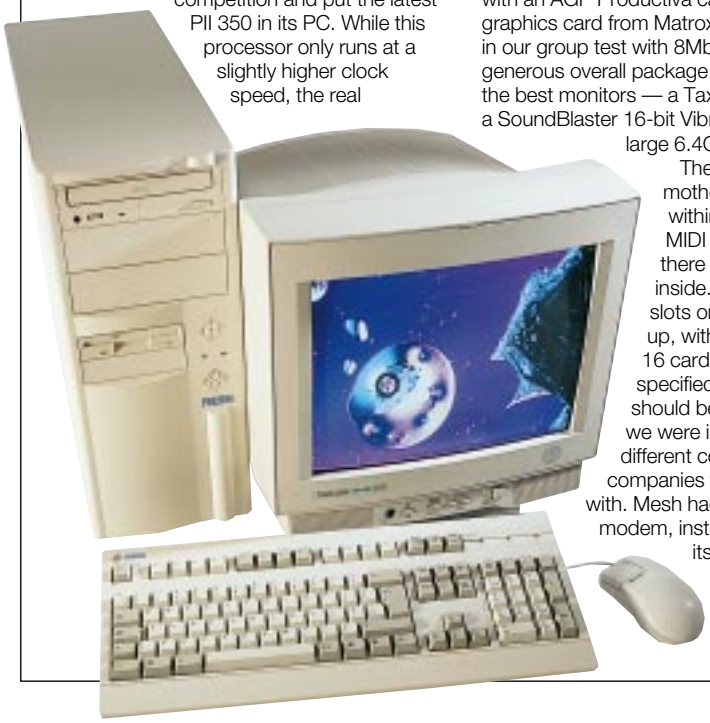
p157 ➢

Mesh Elite Professional PII 350BXA

Personal Computer World Highly Commended

Mesh has a habit of surprising us in group tests, and this time was no exception. While it looked as if a PII 333 would be the fastest processor submitted by any manufacturer, Mesh leapt ahead of the competition and put the latest PII 350 in its PC. While this processor only runs at a slightly higher clock speed, the real difference in performance is to be found in the increase in the system-bus speed, jumping from 66MHz with previous processors to 100MHz in the 350 and 400MHz PIIs.

In addition, the Elite Professional was fitted with an AGP Productiva card, the latest 2D graphics card from Matrox and the only card in our group test with 8Mb of SGRAM. This generous overall package also included one of the best monitors — a Taxan ErgoVision 550, a SoundBlaster 16-bit Vibra sound card and a large 6.4Gb hard drive.



The 440BX motherboard was held within a standard ATX MIDI tower case, and there was plenty of room inside. Of the three ISA slots only one was taken up, with the SoundBlaster 16 card. We hadn't specified that the machines should be internet-ready, as we were interested to see the different configurations the ten companies would come up with. Mesh hadn't included a modem, instead opting to make its machine more performance-driven. The AGP slot was taken up with the Matrox Productiva graphics card, and all the four PCI slots were free. For those users who like to buy a performance-orientated PC and upgrade, there were two free forward-facing 5.25in bays and two free 3.5in bays — one internal and one front-facing.

We were expecting performance increases from the Mesh because of the increase in processor and system-bus clock, but we were still surprised at how the Elite's SYSmark results blew the competition away. The Productiva, despite having 8Mb of memory on the card, is still primarily a 2D card, so its scores on the 3D Final Reality test were, as could be expected, less jaw-dropping. However, this card contributed considerably to the excellent SYSmark scores.

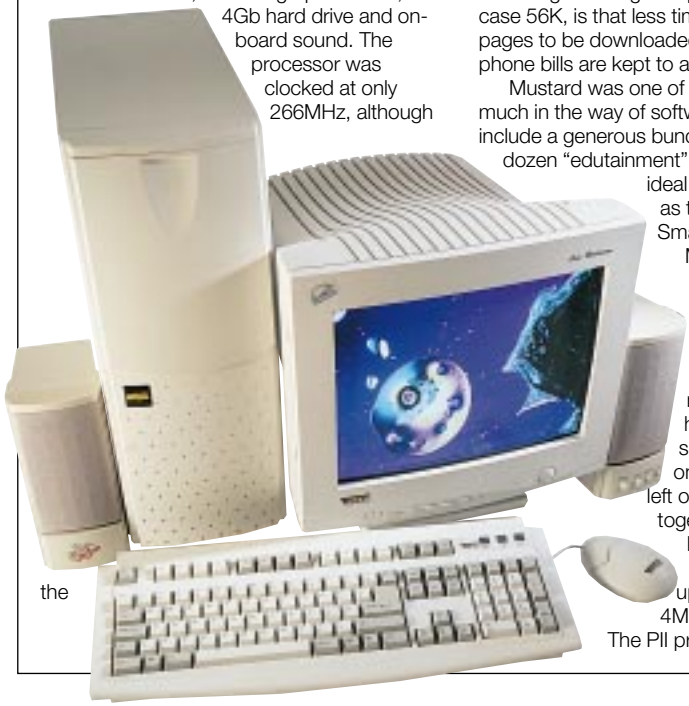
PCW Details

Price £1,145 (£999 ex VAT)
Contact Mesh 0181 452 1111 www.mesh.co.uk
Good Points Powerful PII350 processor. Large hard drive.
Bad Points Slightly disappointed by the 3D scores.
Conclusion A PC for the power-hungry.
Build Quality ★★★★★
Performance ★★★★☆
Value for Money ★★★★☆
Overall Rating ★★★★☆

Mustard MC 753MT

Mustard Computers is a relatively new company, formed last year by ex-employees of Crown. They provided the kind of system configuration most of the manufacturers had chosen for this group test: 64Mb of SDRAM, an AGP graphics card, a 4Gb hard drive and on-board sound. The processor was clocked at only 266MHz, although the Mustard was one of the few PCs here to be fitted with a modem.

We had no problems connecting to the internet, using AOL, one of the online services bundled freely with Windows 95. The advantage of a higher-speed modem, in this case 56K, is that less time is spent waiting for pages to be downloaded from the server, so phone bills are kept to a minimum.



Mustard was one of the few to provide much in the way of software, and it did include a generous bundle. There was a dozen "edutainment" titles that would be ideal for children, as well as the excellent Lotus SmartSuite97.

Mustard had used a PC Chips M715 motherboard, and although the SoundPro 3Dchip was on-board, the motherboard didn't have ports for sound, so they had to be put on a blanking plate. This left one free ISA slot, together with three free PCI slots, and the AGP slot was taken up with an SIS 6326 4Mb graphics card. The PII processor was positioned alongside the PCI slots, making room for the RAM SIMM slots that are an increasingly rare sight on motherboards nowadays. There were four SIMM slots and two DIMM slots in all, although access to them was somewhat hampered by the EIDE ribbon cables. All 64Mb of RAM was contained on one DIMM module.

If you were to fill the other DIMM slot, there would be considerable pressure against it, from the ribbon cable linking the motherboard to the hard drive. Also remember that on some boards you cannot actually mix SIMM and DIMM memory, or if you have a board that does support this, the faster RAM will simply clock itself down to run at the speed of the slower RAM.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Mustard 01727 732005 www.mustard-uk.com
Good Points An internet-ready machine, with bundles of software.
Bad Points Rather fiddly access to the RAM.
Conclusion You could do a lot worse.
Build Quality ★★★☆☆
Performance ★★★☆☆
Value for Money ★★★☆☆
Overall Rating ★★★☆☆

p159 >

Roldec Predator

The Roldec Predator had a PII 300, along with 64Mb of SDRAM and a 3.2Gb hard drive. While the Quantum Fireball is a good-quality hard drive, it was still half the size of some of the other drives we saw. This was really the only component in which Roldec seemed uncompetitive with the other companies, as otherwise it had put together an attractive package.

There was no sound card. Instead, sound was provided via the popular Yamaha OPL3 chip on the motherboard and relayed through excellent Arowana Multimedia speakers. Roldec had also fitted out the Predator with an STB Velocity 128 graphics card with 4Mb of SGRAM (see page 148). A 56K modem was provided.

Obtaining access to the PC's innards usually requires a screwdriver, but the Roldec casing was screw-free. Instead, a single fastener had to be taken out, before pressure was applied to the top and bottom springs and the side panel "snaps" off. It sounds easier than it is, and a first-time user could be convinced that they'd ripped their PC apart.

The insides were impressively orderly, with cables neatly taped up and power cables from the power unit to the motherboard kept out of the way of the SDRAM DIMM modules. Two of the three DIMM slots were taken up on the Intel AL440LX motherboard, leaving one free for extra main memory should you wish to upgrade. As the sound is fitted on-board, there was one free ISA slot. The other was filled with the 56K modem, while all four PCI slots were free. There was one spare front-facing 5.25in drive bay, as well as two free front-facing 3.5in drive bays, should you wish to install extra drives.

With a PII 300 processor, the Predator did not do as well on the 2D SYSmark test as we might have expected, scoring relatively average results. But thanks to the STB graphics card it performed very well on the 3D Final Reality test, earning the best overall score in the group.

PCW Details

Price £1,175 (£999 ex VAT)
Contact Roldec 01902 456464 www.roldec.co.uk
Good Points Good graphics card. Fast modem. Good games machine.
Bad Points Smaller hard drive than most.
Conclusion A powerful PC.
Build Quality ★★★★☆
Performance ★★★★☆
Value for Money ★★★★☆
Overall Rating ★★★★☆

Viglen Contender II

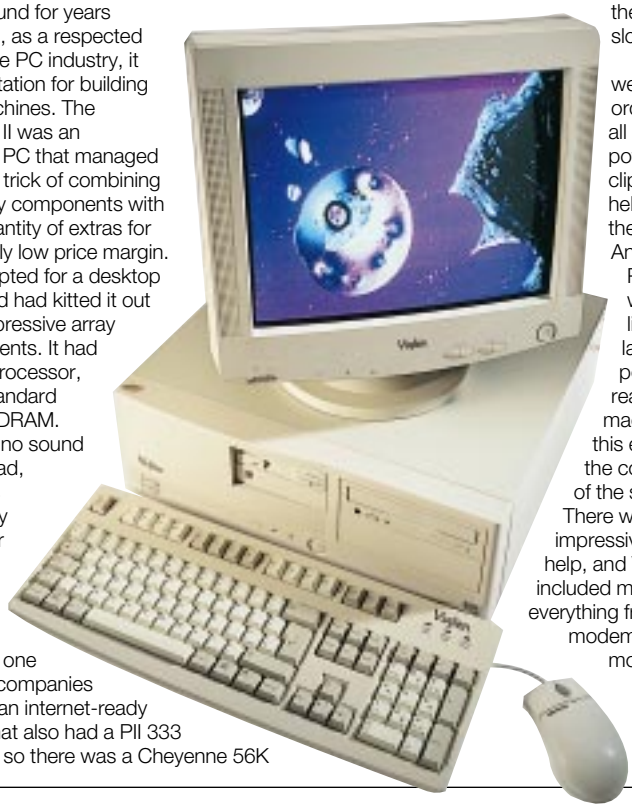
Personal Computer World Highly Commended

Viglen has been around for years and, as a respected player in the PC industry, it has a reputation for building quality machines. The Contender II was an impressive PC that managed the difficult trick of combining both quality components with a good quantity of extras for our relatively low price margin.

Viglenopted for a desktop chassis and had kitted it out with an impressive array of components. It had a PII 333 processor, with the standard 64Mb of SDRAM. There was no sound card; instead, sound was provided by the popular on-board Yamaha OPL3 chip. Viglen was one of the few companies to provide an internet-ready machine that also had a PII 333 processor, so there was a Cheyenne 56K modem in one of the two ISA slots.

The insides were neatly ordered, with all EIDE and power cables clipped and held away from the DIMM slots. Any first-time PC users would have liked the clear labelling of ports at the rear of the machine, and this extended to the colour-coding of the sound ports. There was impressive technical help, and Viglen had included manuals on everything from the modem to the motherboard, and all necessary drivers. Viglen also offered a Windows 95 tutor for any less experienced end-users, as well as MS Works. As a bonus for the PC-proficient, Viglen had preloaded Amidiag software that could run hardware diagnostics on the PC system. In fact, the package offered was very well-rounded, even down to the MS IntelliMouse.

This machine is aimed at the experienced end user interested in performance but who might be looking to upgrade in the future. There was plenty of room for extra components, while the basic power requirements were amply met by ATi's 3D Rage Pro graphics card and the PII 333. As a result, it scored very well in both the 3D Final Reality and the 2D SYSmark office-suite tests, offering excellent all-round performance no matter what it is being used for.



PCW Details

Price £1,175 (£999 ex VAT)
Contact Viglen 0181 758 7000 www.viglen.co.uk
Good Points Great performance. Stacked full of quality components.
Bad Points None that we could find.
Conclusion An excellent machine.
Build Quality ★★★★☆
Performance ★★★★★
Value for Money ★★★★☆
Overall Rating ★★★★☆

CPU overclocking

Overclocking refers to the process of running your CPU at a clock or bus speed that the CPU hasn't been specified for, typically a higher speed. In most cases this is achieved by changing a few settings on your motherboard. In return for five minutes of your time, you can increase the performance of your PC for zero cost. The curious thing is that most PCs can benefit from mild overclocking: provided you don't go mad, your PC will probably run just fine. Needless to say, CPU manufacturers take a dim view of overclocking and try to discourage it.

Just about every sort of x86 processor can be overclocked. The 486, Pentium, Pentium Pro and Pentium II can all be overclocked, as can non-Intel processors from the likes of AMD and Cyrix. However, it has to be said that the best results are often obtained from Intel silicon, presumably because they are so conservatively rated. In my experience, AMD and Cyrix processors tend to run hot to start with and overclocking makes them hotter still, which is not what is wanted.

Turning up the heat

This highlights the main problem of overclocking, which is heat. Overclocked processors run hot and unless the CPU is properly cooled, overheating can cause the processor to misbehave and in the long term cause a kind of internal chip "rot" called electromigration. Most chips can safely run at 80ºC, which is very hot indeed, too hot to touch, but a cooling fan can drop this to 50ºC or less, so this degradation needn't be a major threat.

So if you're bent on overclocking, the first thing to do is to track down a decent heat sink plus cooling fan. I have to say, most cooling fans I've seen sold are very low-quality devices with a really short life. Do try to track down decent-quality ball bearing motor fans. Another tip is to use some silicon heat-sink compound to bond the heat sink to the CPU top — this makes a big difference to the transmission of the heat.

Cutting speed

Another point to bear in mind is that overclocking doesn't always deliver significant speed gains. There are certain CPU speeds which may not be worth overclocking. These are the ones that involve cutting the bus speed. So, overclocking a P133 to a P150, or a P166 to P180, is generally *not* a good move, as in both cases you drop your system speed by ten percent from 66MHz to 60MHz, and the PCI speed from 33MHz to 30MHz, while gaining very little in terms of internal CPU speed. This is borne out by iCOMP scores for the P133 and P150, 1110 vs 1176. In other words, a 13 percent increase in clock speed translates into a performance gain of just six percent.

By the same token overclocking anything faster than 150MHz Pentium (including the Pentium Pro and Pentium II) seems to offer the best bang per buck.

Roger Gann

CPU Internal Speed	System Speed	PCI Bus Speed	Multiplier
Pentium			
75MHz	50MHz	25MHz	50x1.5
90MHz	60MHz	30MHz	60x1.5
100MHz	66MHz	33MHz	66x1.5
120MHz	60MHz	30MHz	60x2
133MHz	66MHz	33MHz	66x2
150MHz	60MHz	30MHz	60x2.5
166MHz	66MHz	33MHz	66x2.5
200MHz	66MHz	33MHz	66x3
233MHz	66MHz	33MHz	66x3.5
Pentium II			
233MHz	66MHz	33MHz	66x3.5
266MHz	66MHz	33MHz	66x4
300MHz	66MHz	33MHz	66x4.5
333MHz	66MHz	33MHz	66x5

Step by step

Before we go any further, I have to keep the *PCW* lawyers happy and issue a very stern warning to you, gentle reader. I have to stress that overclocking your processor is not for the faint hearted, and if you don't know what you're doing you could end up frying your processor or motherboard, or worse. Only attempt this if you're not worried about your warranty (which will probably be invalidated) or toasting your CPU. Beyond this point, you are on your own!

- If you have a modern "jumperless" motherboard, then the changes required to overclock can be performed from the keyboard via CMOS setup. All other motherboards will require you to take the cover off your PC and move some jumper sleeves or DIP switches, so you'll definitely need your motherboard manual for this. Sometimes the jumpers are labelled on the motherboard but often they're not, so hunt down that manual and read it thoroughly.
- There are two motherboard settings that need to be changed in order to overclock, the bus speed and the processor multiplier. See the table for details of bus speed and multiplier for a given processor speed.
- The Pentium (and Pentium Pro) supports three bus speeds, 50, 60 and 66MHz, but some very recent motherboards additionally offer 75 and 83MHz as well. The Pentium II supports just 66MHz. To change the bus speed, look in your motherboard manual for something like "CPU External (BUS) Frequency Selection" — these are the jumpers that need moving. If it's set to 66MHz, leave it set to this value unless you can go up to 75MHz.
- If you do up the bus speed, remember this also increases the PCI bus (which runs at 50 percent of the system bus speed), from 30 or 33MHz to 37.5 or even 41.6MHz. This can cause grief with PCI cards, which expect to run at 33MHz. Also at faster bus speeds, memory can get iffy and you really need good-quality RAM to run at these speeds.
- Each CPU uses a multiple of the bus speed, the so-called bus multiplier. For example, a P120 uses a X2 multiplier on a 60MHz bus while a P166 uses a X2.5 multiplier on a 66MHz bus. Intel Pentium CPUs support the following multipliers: x1.5, x2, x2.5 and x3. Intel Pentium Pro CPUs support x2.5, x3, x3.5 and, x4. To change this setting, find something like "CPU to BUS Frequency Ratio Selection" in your motherboard manual.
- Another thing that often needs changing is the power supply to the CPU — processors that run faster, draw more juice. Although recent Pentiums should draw 3.3V, when overclocked you may find they run better at 3.45V, the VRE setting. Don't be overly concerned about pumping too many volts into your processor — a Pentium has a relatively wide voltage safety margin.
- Finally, keep in mind that very often the best, most stable results are achieved by going up a notch in speed, i.e. from 166 to 233MHz or 233 to 266MHz. If you overdo it, you'll probably just wind up with a hung system or maybe even worse. In which case, simply put the jumpers back the way they were.

Roger Gann

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Table of Features

Personal Computer World Editor's Choice

Manufacturer	Avontech Computer Systems	Brother	Choice Systems	DAN Technology	Dell
Model	**PII-266**	**Professor 971**	**Ultra**	**Dantum II/W5**	**Dell Dimension**
Price (ex VAT)	£999	£999	£999	£999	£999
Price (inc VAT)	£1,175	£1,175	£1,175	£1,175	£1,175
Telephone	01275 462260	01279 416888	0181 9939003	0181 830 1100	0870 1524850
Fax	01275 462203	01279 418130	0181 9939936	0181 830 1122	01944 723695
Web site address	www.avontech.co.uk	kyodai.brother.co.uk	n/a	www.dan.co.uk	www.dell.com
Standard warranty	3yrs RTB	1yr onsite	2yrs RTB	1yr RTB	1yrCAR
Warranty options	n/a	extend to 2/3yrs	2yrs onsite	On-site upgrade	4yrs on-site
Technical support	9-6 Mon-Fri	9-6pm Mon-Fri	9.30-6pm Mon-Fri	9.30-6pm Mon-Fri	8-8Mon-Fri
Hardware spec					
Processor	PII-266	PII 233	PII 333	PII 266	PII 300
RAM	64Mb	32Mb	64Mb	64Mb	64Mb
RAM type	SDRAM	SDRAM	SDRAM	SDRAM	SDRAMMaxtor
Hard disk	Fujitsu	Seagate	Maxtor	Seagate Medalist	DiamondMax
Size(Gb)/interface	4.3Gb/EIDE UDMA	3.2Gb/EIDE UDMA	4.3Gb/EIDE UDMA	6.4Gb/EIDE UDMA	4.3Gb/EIDE UDMA
Motherboard components					
Motherboard	Intel ATX	Elite ATX	Chaintec ATX	SuperMicro ATX	Intel ATX
Chipset	Intel 440LX	Intel 440LX	Intel 440LX	Intel 440 LX	Intel 440LX
L2 cache	512Kb Intel Flash	512Kb	512Kb	512Kb	512Kb
BIOS type	Upgradeable	Phoenix	Award	AMI	Dell/Phoenix
BIOS Revision	v5.0	v4.05	v1.0	v1.34	A07
Expansion and I/O					
Spare bays 3.5in/5.25in	2/2	0/2	1/2	1/2	3/1
AGP slots	1	1	1	1	1
PCI / ISA / shared slots	4/2/1	4/2/1	5/3/1	4/3/1	3/1/1
USB/serial/parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/1/1/2
Multimedia					
CD-ROM manufacturer	Panasonic CR 586V	Panasoni CR-585V	Goldstar 24X	Panasonic CR-586	Toshiba XM6202B
CD-ROM speed/interface	32X/EIDE	24X/EIDE	24X/EIDE	32X/EIDE	32X/EIDE
Sound card manufacturer	Yamaha	Yamaha	ESS	SoundBlaster	Yamaha
Sound card model	OPL2	OPL3	1869	AWE64	OPL3 Onboard
Speakers	Zifi 2	Deluxe	OEM 50Watts	Dan Hi-Fi	None
Graphics & Monitor					
Graphics card	Trident 3DImage 975	Ati 3D Charger	Cirrus Logic 546X	Ati Xpert@Work	STB Velocity
Graphics RAM/Max RAM	4Mb/4Mb/VRAM	4Mb/4Mb/SGRAM	4Mb/4Mb/VRAM	4Mb/8Mb/SGRAM	4Mb/4Mb/SGRAM
Monitor model	Hansol 15in E15AL	AOC 5VLR	15in Viewpoint 5VIr	CTX 1569se	Dell D828-L
Monitor size (inches)	15in	15in	15in	15in	15in
Max refresh rate @ 1,024 x 768 (NI)	60Hz	60Hz	85Hz	85Hz	60Hz
Other Information					
Modem speed (Kbps)	n/a	56	n/a	56	56
Other extras	None	None	None	None	None
Software	None	MS Works v.4	None	Lotus SmartSuite97 Quicken SE PagePlus v.3 MS Works	MS Works MS Money Dell DMI
Y2k compliant?	●	●	●	●	●

Key: ● Yes ○ No

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Table of Features

Personal Computer World Highly Commended

Personal Computer World Highly Commended

Manufacturer	Dotlink	Mesh Computers Elite Professional	Mustard	Roldec Systems	Viglen
Model	**Magnum II - 333 SE**	**PII 350BXA**	**MC753MT**	**Predator**	**Contender II**
Price (ex VAT)	£999	£999	£999	£999	£999
Price (inc VAT)	£1,175	£1,175	£1,175	£1,175	£1,175
Telephone	0181 9025802	0181 452 1111	01727 732005	01902 456464	0990 944944
Fax	0181 903 6508	0181 208 4493	01727 732199	01902 452592	0181 758 7080
Web site address	n/a	www.meshplc.co.uk	www.mustard-uk.com	www.roldec.com	www.viglen.co.uk
Standard warranty	3yrs RTB	2yrs RTB	1yr onsite	5yrs RTB	1yr RTB
Warranty options	n/a	3yrs on-site	3yrs onsite	3yrs onsite	n/a
Technical support	9.30-6pm Mon-Fri	9-5.30 Mon-Fri	9-5.30 Mon-Fri	9-5.30pm Mon-Fri 10-5 Sat	9-6pm Mon-Fri 9-1pm Sat
Hardware Spec					
Processor	PII333	PII 350	PII 266	PII 300	PII 333
RAM	64Mb	64Mb	64Mb	64Mb	64Mb
RAM type	SDRAM	SDRAM	SDRAM	SDRAM	SDRAM
Hard disk	Maxtor Diamond	IBM Deskstar5	Seagate	Quantum Fireball SE	GB IBM
Size(Gb)/interface	4Gb/EIDE UDMA	6.4Gb/EIDE UDMA	4.3Gb/EIDE UDMA	3.2Gb/EIDE UDMA	4.3Gb/EIDE UDMA
Motherboard components					
Motherboard	DFI P2XLX ATX	ASUSTeK ATX	PC Chips ATX	Intel ATX	Intel ATX
Chipset	Intel 440LX	Intel 440 BX AGPset	Intel 440LX	Intel 440LX	Intel 440LX
L2 cache	512Kb	512Kb	512Kb	512Kb	512Kb
BIOS type	Award	Award	AMI	Intel/Phoenix	Intel/Phoenix
BIOS revision	v4.51	v4.51PG	v2.5	v7.0	v7.0
Expansion and I/O					
Spare bays 3.5in/5.25in	1/2	2/2	1/2	2/1	1/1
AGP slots	1	1	1	1	1
PCI / ISA / shared slots	4/3/1	4/3/1	3/2	4/2/1	4/2/1
USB/serial/parallel/PS2	2/2/1/2	2/2/1/2	2/1/1/2	2/2/1/2	2/2/1/1
Multimedia					
CD-ROM manufacturer	Asus34	TEAC CD-532E	Sony CR611	TEAC 32X	Panasonic 24X
CD-ROM speed/interface	34X/EIDE	32X/EIDE	24X/EIDE	32X/EIDE	24X/EIDE
Sound card manufacturer	Creative Labs	Creative Labs	Sound Pro	Yamaha	Yamaha
Sound card model	AWE64	Vibra 16	3D	OPL3	OPL3
Speakers	Juster 965	Contec Con 50W	Surf Sound	Arowana	On monitor
Graphics & Monitor					
Graphics card	Ati Xpert@Work	Matrox Productiva G100	SIS 3D Pro	STB Velocity	ATI 3D Charger
Graphics RAM/Max RAM	4Mb/8Mb/SGRAM	8Mb/8Mb/SGRAM	4Mb/4Mb VRAM	4Mb/4Mb/SGRAM	4Mb/4Mb/SGRAM
Monitor model	Hansol 501P	Taxan ERGO 550	Videal MO15VID	ADI E40	Viglen Envy ISDS
Monitor size (inches)	15in	15in	15in	15in	15in
Max refresh rate @					
1,024 x 768 (NI)	85Hz	75Hz	70Hz	75Hz	75Hz
Other information					
Modem speed (Kbps)	56	n/a	56	56	56
Other extras	None	None	None	None	None
Software	Lotus SmartSuite97	Lotus SmartSuite 97	Lotus SmartSuite97 19 Educational titles	Lotus SmartSuite97 PC Check	MS Works
Y2k compliant?	●	●	●	●	●
Key: ● Yes ❍ No					

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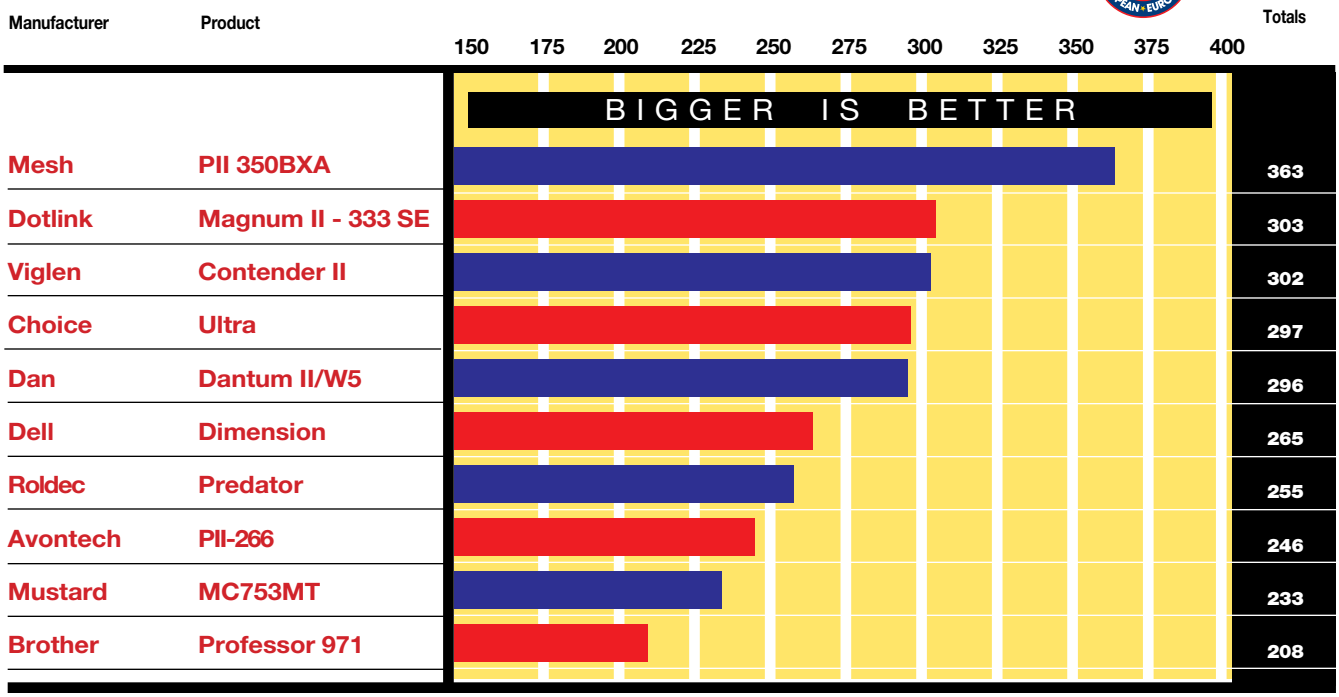
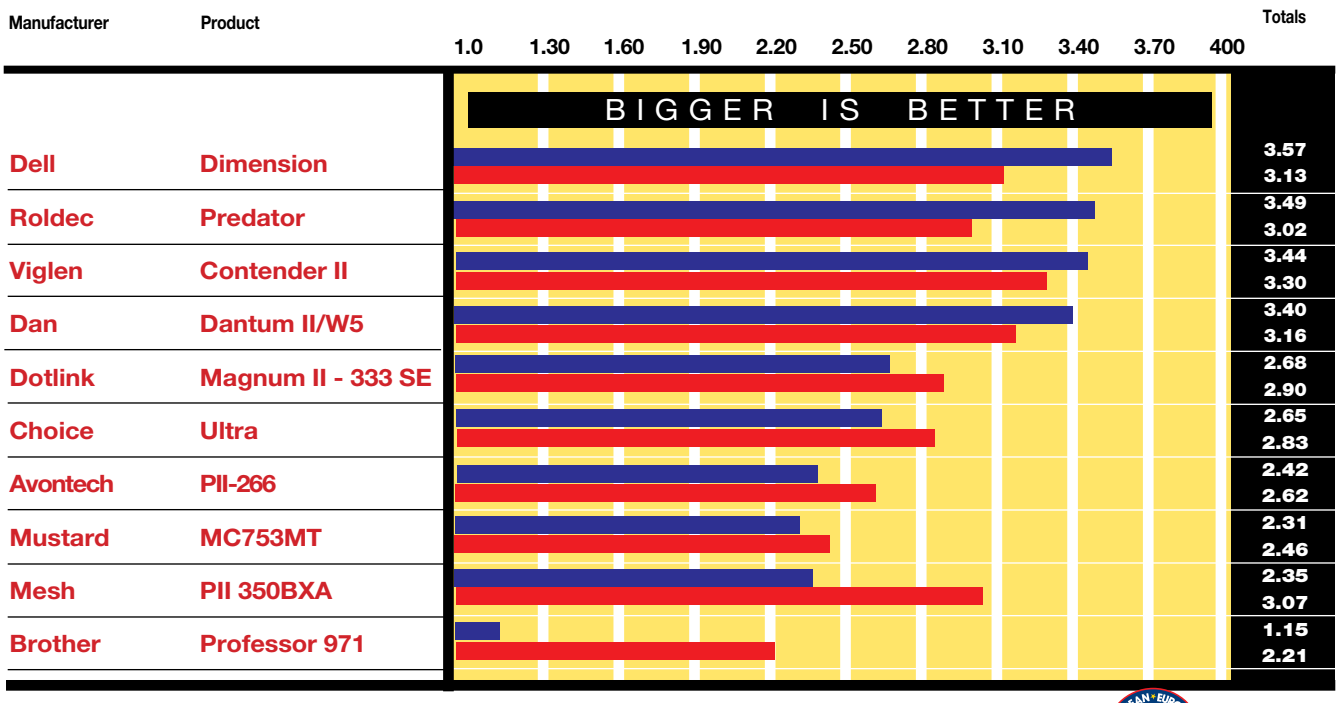
BAPCo SYSmark Windows 95 test results



Final Reality 3D and overall test results



How we did the tests

The SYSmark test is provided by BAPCo (Business Applications Performance Corporation) who specialises in designing tests based on widely-used applications. Its members include heavyweight figures in the industry like Intel, Compaq, and IBM. The BAPCo SYSmark tests measure the speed of the PC running eight office applications: MS Word 7, Lotus WordPro 96, MS Excel 7, Borland Paradox 7, CorelDraw 6, Lotus Freelance Graphics 96, MS Powerpoint 7, Adobe Pagemaker 6. The test measures the time taken by the PC to perform a variety of tasks in each application, and each test is performed three times to ensure results are consistent. Performance depends on a variety of factors: processor speed; RAM; graphics card and disk I/O. As the tests are based on business software, the result reflects how the PC will perform in a real world situation. The better the score, the longer the bar.

Final Reality is a suite of graphical tests designed to examine the processing power of the 3D accelerator on your graphics card, 2D image processing and AGP. It runs under Win95 and DirectX 5 and uses a 3D engine developed by Remedy. It supports Direct3D, a 3D standard designed by Microsoft, and looks at how the graphics accelerator handles the kind of data it would have to process when playing a game. Final Reality tests the speed of the processor and visual appearance, that is how the card handles techniques like transparency, fogging, and alpha blending. It tests these visual appearance features at different points during the benchmark test and it performs the tests simultaneously just as in a real game. The visual appearance factors are weighted in importance and combined with the processing speed to produce an overall mark. Again, the higher the score, the better the result. Final Reality can be downloaded from www.vnu.co.uk.

Monitors are scrutinised using Display Mate for Windows, and tested at a number of resolutions and colour depths.

Editor's Choice

The price slashing we have seen over the last year may spell the end for some small PC companies, but it has heralded the start of truly affordable computing for the consumer. There is an argument to be made against the rapid advance of PC technology, that buying a PC is now like buying a car. In both cases, the value of the purchase begins to depreciate almost as soon as you have bought it. This is undoubtedly true, but with prices cut so low, the consumer can afford to invest in those new technologies a little more often.

While there were PCs in this group whose configurations we thought a little stingy, at least half represented an impressive blend of performance and value. We looked at machines that would be as suitable in the office as in the home, some processing behemoths that would suit the PC power-hungry boy racer, or all-round entertainers that could offer something to all the family.

While these weren't ultimately the winners in this group test, honourable mentions should go to a few PCs we still thought represented quality and good performance. The well-built Predator from Roldec deserves a mention. It had a good all-round configuration, but although it was fitted with a 56K speed modem, its 3.2Gb hard drive did not live up to the expectations set by the hulking 6.4Gb we saw in other machines.

The machine that came closest to stealing an award was the Dotlink PII 266. It had a very impressive configuration, and would surely have picked up a prize had it not been for the comparatively poor Final Reality 3D scores, which were a disappointment given the speed of the processor.

Sometimes in group tests there is a single PC that stands head and shoulders above the rest, making the Editor's Choice an easy one. This month though, picking an overall winner has resulted in much wringing of hands and brow-furrowing. The first **Highly Commended** award goes to **Mesh** for its **Elite Professional PII**. The Professional's stunning SYSmark scores should dispel talk that there aren't large performance gains to be had from graduating from a 333MHz to the 350MHz. We were impressed by the size of the hard drive accompanying such a powerful processor, because when some PC companies supply very fast CPUs they tend to cut corners in areas like the hard drive and main memory. The Mesh PC was one of only a handful of the PCs to be fitted with a 6.4Gb hard drive, as well as the ubiquitous 64Mb of SDRAM.

The Professional was a strong contender for the main prize, but size isn't everything, and we felt that the use of the mainly 2D Productiva card might limit it largely to office users. If you are looking to purchase a PC for business that will run your 2D applications as if they were on greased rails, then look no further. However, despite the 8Mb of SGRAM on-board, we were disappointed by the 3D Final Reality results, in comparison with the stunning SYSmark scores.

The other **Highly Commended** goes to the excellent **Contender II** from **Viglen**. It was particularly impressive in the sets of tests we ran, scoring very strongly in both 2D and 3D tests. This was combined with an excellent configuration: large processor, 56K modem and excellent technical help.

It was a very difficult decision choosing an eventual winner, and it is safe to say all three award recipients represent excellent value and good performance. The **Editor's Choice**, however, is the **Dan Dantum II**, which scored very impressively in both 2D and 3D tests, despite having a slower processor on paper. Dan had combined the PII 266 with an excellent package of components: a huge 6.4Gb hard drive, 56K modem and AWE-64 sound card. The monitor, a Mag AX1595, was one of the best in the group test, and it combined well with the impressive ATi Xpert@Work graphics card. Dan had also put together a generous software package, with Lotus SmartSuite 97, Quicken, Page Plus and MS Works.

Above **Dan Dantum II**
Far left **Mesh Elite Professional**
Left **Viglen Contender II**

PCW Awards 1998

Welcome to the 1998 *Personal Computer World* Awards. Over the following pages we will reveal the top products, companies and services of the year. Those which have made a significant contribution or difference to the PC industry in 1998 by offering outstanding performance, innovation and value for money.

The judges this year comprised the entire *PCW* Editorial team, joined by the VNU European Labs, key contributors and, for the fourth year running, you, the *PCW* readers.

In our February and March issues we invited you to vote for your favourite products, companies and services, and as usual you didn't disappoint us. Your contribution has played a big part in deciding the nominees and overall winners of our 1998 Awards.

In the case of our first six awards, for PC service and reliability, the decision has been yours entirely. The results of this exclusive reader survey are shown on the next page, and you can be certain that these will be scrutinised and taken very seriously by the computer industry.

Beyond these six exclusive Reader Awards we have a further 24 categories, reflecting the PC industry and its changes over the past year. Old favourites such as Best Business, Home and Budget PCs are joined by Best Digital Camera, Best Web Software and Best ISP, the latter being a category with an overwhelming number of reader nominations.

All the products nominated are worthy best buys that are currently available. Our overall winner and two equal runners-up in each category are the products, companies and services you should be considering first when it comes to making your next buying decision.

So now, without further ado, check out the winners and worthy runners-up. Some you may expect, but there are a few surprises too.

Gordon Laing
Managing Editor

Winner of reader draw
Congratulations to Mrs J Van Gardingen of Fenstanton, Cambridgeshire, who has won £1,000 to spend with a *PCW* advertiser of her choice. A big well done also to the 100 runners-up who will receive the latest issue of *PCW* on CD.

PCW Awards 1998 Contents

PHOTOGRAPHY by David Whyte

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Reader Awards

For the fourth year running, *Personal Computer World*'s readers were invited to vote for the suppliers and companies they believed were doing the business in 1998. And, as in previous years, the response was enormous.

The PC industry takes these awards extremely seriously because they reflect what you, the actual buyers out there, really think and where you end up spending your money. In the six categories below, the decision was entirely down to reader votes and reader votes alone. So, here are the results of the *PCW* Reader Awards for 1998.

Best High Street Retailer

PC World 0990 464464

Runners-up
Dixons 08000 682868
Time 01282 777111

Best Direct PC Supplier (Mail Order)

Gateway 0800 362000

Runners-up
Dan Technology 0181 830 1100
Dell Computers 01344 724872

Best Software Dealer

Software Warehouse 01675 466467

Runners-up
Dabs Direct 0800 674467
Watford Electronics 01582 745555

Best Telephone Support

Dell Computers 01344 724872

Runners-up
Dan Technology 0181 830 1100
Gateway 0800 362000

Best Hardware Dealer

Simply Computers 0181 498 2100

Runners-up
Tech Direct 0181 286 2222
Choice Peripherals 01909 530242

Most Reliable PC Manufacturer

Dan Technology 0181 830 1100

Runners-up
Dell Computers 01344 724872
Hewlett-Packard 0990 474747

Best PCs: Important information — please read

Each of our three PC categories comprises systems selected from a variety of recent group tests that sufficiently impressed us and the reader voters to be nominated for an award. You should note that due to the different specifications and prices at the time of testing, we have listed just the manufacturer name and contact number at the end of each category. Please call the company direct for the specifications applicable to your requirements, and for the latest prices.

Best PC for Business: Hewlett-Packard Vectra VL

It seems only a short time ago that there was a clear distinction between home and business. Today, with countless small groups and individuals setting up by themselves, a business could be contained within a corner of your living room, a million miles away from the conventional office environment.

In the very near future, big businesses may well opt for the network-computer concept of a single large server with a collection of dumb terminals attached. It's ironic, since it's these very same big businesses which dumped essentially the same system a few years bago in favour of a PC on every desk. For now, though, most businesses, large and small, are still buying self-contained PCs. Our award for Best PC for Business takes the small-to-medium-enterprise approach of specifying an excellent system from a good, reliable supplier. The runners-up are **Viglen** and **Elonex**, which particularly impressed us with their **Ultimate PC266W** and **PTX-6300/I** systems respectively. Both are fine choices for a decent, solid, business PC.

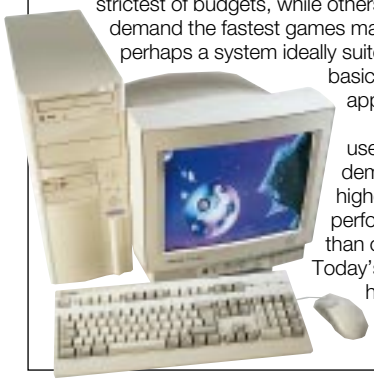
The winner is **Hewlett-Packard** for its **Vectra VL**, one of the first 400MHz Pentium II systems we tested. Not only does it boast awesome performance, but its build quality is superior too. The Vectra VL is a system on which you can utterly rely.

PCW Details

Hewlett-Packard 0990 474747
Elonex 0181 452 4444
Viglen 0990 944944

Best PC for the Home: Mesh Elite Professional PII

What makes an award-winning home PC? For some, the ideal domestic PC will be one that meets the strictest of budgets, while others may demand the fastest games machine or perhaps a system ideally suited to basic business applications. Some users will demand a higher raw performance than others. Today's typical home PC features decent multimedia facilities in terms of high-quality sound, 3D graphics and, increasingly common these days, a DVD drive with MPEG video decoding.



Home PC users are becoming far more sophisticated, and instead of tinkering with a little accounting and letter writing, they are throwing themselves into desktop publishing, music production, photo retouching, web browsing and even the creation of their own web pages.

As far as we're concerned in our 1998 Awards, a home PC is a good all-rounder which, in terms of price, falls between our entry-level and business PC categories.

Our runner-up prizes go to **Armari** and **Evesham Micros**, which have turned out fine systems in the past year. Both companies have produced consistently high-performing PCs, often including innovative components and always built to the highest standards.

Our award for the Best Home PC goes to **Mesh** for its **Elite Professional PII**, reviewed in this issue (*p157*). It boasts a spectacular specification and very strong performance for only £999 (ex VAT) at the time of writing. It's a perfect home PC at a great price.

PCW Details

Mesh 0181 452 1111
Armari 0181 810 7441
Evesham Micros 0800 634 5999

Best Budget PC: Linear Computers Linear Excel

It's fun looking at budget PCs to see what they can offer at rock-bottom prices. To us, a budget PC is one which sells for around £500 (ex VAT) and we are often amazed at their quality and flexibility.

Generally, you'll get a system based on a 200MHz Pentium-class processor with 16-32Mb of RAM, a disk drive with at least 2Gb capacity and basic multimedia capabilities. But you can't expect too much in the monitor department and 14in models are the norm. Nevertheless, our nominees managed to source some quite reasonable displays. A budget PC will be sufficient for most day-to-day tasks like basic office applications, accounts, games and getting onto the internet. Okay, it may not match the power of the fastest systems, but unless you've got one sitting next door for a direct comparison, a budget PC could be exactly what you're after.

Our runners-up this year are **Watford Electronics' Aries Multimedia Pro** and **Roldec's Pro System**, both offering superb configurations at rock-bottom prices.

The winner is **Linear Computers** which matched our £500 challenge in the May issue and built a great machine, aptly named the **Excel**, of which anyone could be proud.

PCW Details

Linear Computers 0800 622094
Roldec 01902 456464
Watford Electronics 01582 745577

p182 >

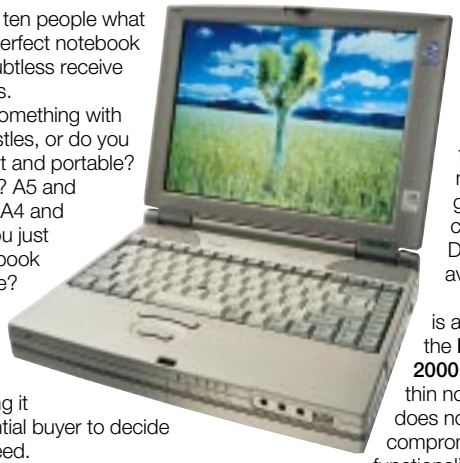
Best Notebook: Toshiba Satellite Pro 440

If you were to ask ten people what their idea of the perfect notebook is, you would doubtless receive ten different answers.

Do you require something with all the bells and whistles, or do you need something light and portable? If so, in what format? A5 and reasonably thick, or A4 and wafer thin? Or do you just need a reliable notebook at a reasonable price?

This year, more than any other, notebooks have astounded us with their diversity, making it difficult for the potential buyer to decide exactly what they need.

Our choices this year reflect that diversity.



The first runner-up is the **IBM ThinkPad 770**, for housing not only the first Tillamook chip but also the first 14.1in TFT screen, and for being the first notebook to have 3D graphics. It is also capable of accepting DVD when it becomes available.

The second runner-up is a very different machine, the **Digital HiNote Ultra 2000**. It's a light and very thin notebook, but one which does not force you to compromise on either functionality or performance.

Our best notebook this year wins not for flashy technology, but for all-round value for money. The **Toshiba Satellite Pro 440** was a runner-up in our last notebook group test, not because it had the most impressive spec, but because it's very well built, performed well in our tests and offered the best value for money in the long run.

PCW Details

Toshiba Satellite Pro 440 £2263.05 (£1926 ex VAT). Toshiba 01932 828828

IBM ThinkPad 770 £4,230 (£3,600 ex VAT). IBM 0990 727272

Digital HiNote Ultra 2000 £3,166.63 (£2,695 ex VAT.) Digital 0345 227228

Best Personal Laser Printer: Panasonic KX-P6300

The past year has seen the development of a new type of laser printer: the personal laser printer. For the first time, prices have fallen sufficiently for the average user to seriously consider a laser printer for personal use. If you need superb text and graphics but can do without colour, the world is now your oyster.

The first runner-up, the **Minolta PagePro 6**, won a deserved Highly Commended award in our February group test. It is a quick, fully-featured printer with excellent-quality output on text and graphics. It has 2Mb of memory as standard and supports native DOS printing via 5e PCL emulation.

The second runner-up, the **Kyocera FS-600**, is another Highly Commended award winner. It topped the charts in our image quality tests and we were especially impressed with the solid blacks and graphic images. The standard 2Mb of memory is upgradable to a whopping 34Mb if required.

The winner of the *PCW* Award for Best Personal Laser Printer is the **Panasonic KX-P6300**. It was our Editor's Choice in the February group test because of its combination of speed, quality and value for money. Admittedly, it lacks many of the features present on the more expensive models: for instance, it doesn't have a straight paper path for non-standard media and can only print from Microsoft Windows operating systems.

However, output quality is excellent and it went like a rocket in our speed tests. And, when you take into account the low, low, price, you just can't get any better than this.

PCW Details

Panasonic KX-P6300 Street £202.10 (£172 ex VAT). Panasonic 0500 404041

Kyocera FS-600 Street £262.03 (£223 ex VAT). Kyocera 01734 311500

Minolta PagePro 6 Street £286.70 (£244 ex VAT). Minolta 01908 200400

Best Business Laser Printer: HP LaserJet 4000TN

Just as the price of personal laser printers is falling, so the range of functions on business lasers is growing. Ever-diminishing print times, with pin-sharp output quality, makes them suitable for networked business use.

The first of our two runners-up in this category is the **QMS Desklaser 1400P**. Boasting a maximum output of 14ppm and a 550-sheet paper tray, this machine has a surprisingly small footprint. An 11Mb memory and a 40MHz RISC processor come as standard. It is PostScript L2 and PCL5e compliant with a maximum resolution of 2400dpi, and all at a great price.

The **Lexmark Optra S1250** is similarly crowned for its 12ppm engine, 250-sheet input tray expandable to 1,250, and small footprint. It has true 1200dpi resolution output, 4Mb RAM as standard and a wide range of direct or network connection options.

Hewlett-Packard's LaserJet 4000TN walks away with the winner's trophy. It is the first product designed specifically for use with HP's JetSend technology, allowing documents to be sent direct from peripheral to peripheral without computer intervention. Network-ready with a 100MHz RISC processor and a maximum 100Mb RAM, this speedy unit delivered ten pages of text in just 54 seconds in our tests. The 10,000-page toner cartridge and dual 250-page paper-feed trays mean this printer will need little human intervention in a busy environment. Duplexing modules, memory upgrades and hard drive cards are optional.

PCW Details

HP LaserJet 4000TN £1,662.63 (£1,415 ex VAT). Hewlett-Packard 0990 474747

QMS DeskLaser 1400P £938.83 (£799 ex VAT). QMS 01784 442255

Lexmark Optra S1250 £1,056.33 (£899 ex VAT). Lexmark 01628 481500

p184 ➢

Best Inkjet Printer: HP DeskJet 720C

Last year saw a proliferation of inkjets in both the workplace and the home. The technology behind them put high-quality colour printing capabilities into the hands of everyday users, and a drop in price made them an affordable purchase.

The first of the two runner-up awards this year goes to **Epson** for its **Stylus Photo**, a printer which more than deserves its name for its unbeatable reproduction of photographic-quality images with bright, vibrant colours on a wide variety of paper types.

The second runner-up award goes to **Canon** for its **BJC-80**, one of the smallest, smartest printers ever reviewed by *PCW*. It survives on exceptionally cheap supplies and incorporates an ingenious scanner option to replace the print head. In the Christmas group test, it was our Editor's Choice. It was fast, and produced a full-bleed A4 photo in just over 12 minutes.

This year's winner, for the second year running, is **Hewlett-Packard**. Its new **DeskJet 720C** provides excellent all-round output, coping admirably with both photographic and business graphics as well as presenting good-quality text output on normal office paper. The new ten-picolitre technology championed by this brand ensures that the minimum of white paper shows through on light areas, while the fast print engine took one minute to deliver five full pages of black text. Its paper-handling abilities, coupled with its relatively small footprint, make the DeskJet 720C a first-class printer.

PCW Details

HP DeskJet 720C £270.25 (£230 ex VAT). Hewlett-Packard 0990 474747

Epson Stylus Photo £233.83 (£199 ex VAT). Epson 01442 61144

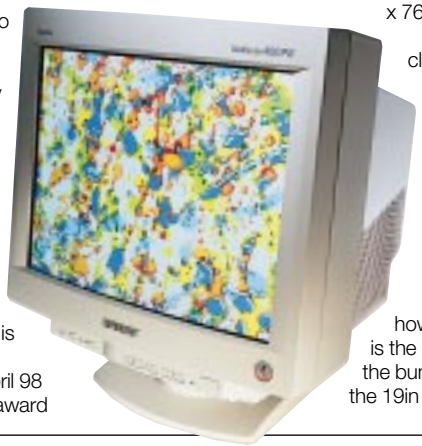
Canon BJC-80 £233.83 (£199 ex VAT). Canon 0121 680 8062

Best Monitor: Sony MultiScan 400PST

The predominance of 17in monitors was confirmed in 1998 as they won their battle over the formerly predominant 14in and 15in models. At the time of last year's *PCW* Awards we were beginning to see the emergence of large-screen projectors and wider use of flatpanel displays; yet this year we find them hardly more prevalent than they were 12 months ago, largely on account of cost. The introduction of 19in screens has brought greater choice.

This year, the **Diamond Pro 700** monitor from **Mitsubishi** receives one of our runner-up awards. With a 16in viewable diagonal, this Trinitron tube easily displays flicker-free images up to an impressive 1600 x 1200. The picture is crisp and colours are vibrant.

The **Nokia Multigraph 447Za**, an April 98 *PCW* Editor's Choice, receives a similar award for its 19 easy-to-use front-mounted controls and built-in 5W speakers. The 15.6in viewable diagonal tube has an impressive non-interlaced refresh rate of 90Hz at 1024 x 768.



The clear winner, however, is the baby of the bunch, the 19in **Sony MultiScan 400PST**. Attractive, and with a full 18in viewable diagonal Trinitron tube, this monitor has both D-SUB and BNC connectors for connecting it to two computers at a time, and there is little variation in picture sharpness across the screen. A comprehensive and easy-to-use on-screen display with a 75Hz non-interlaced refresh rate at 1600 x 1200 resolution, makes this monitor a joy to use.

PCW Details

Sony MultiScan 400PST £821.33 (£699 ex VAT). Sony 0990 424424

Nokia Multigraph 447Za £440.63 (£375 ex VAT). Nokia 01793 512809

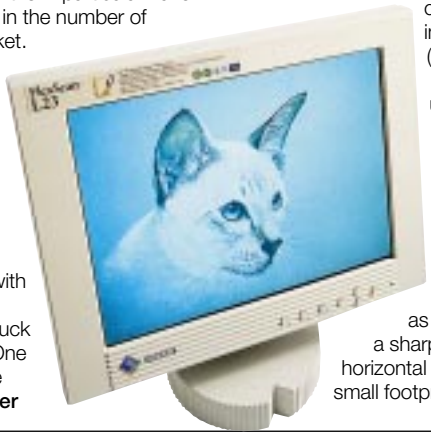
Mitsubishi Diamond Pro 700 £569.88 (£485 ex VAT). Mitsubishi 01707 276100

Best Flatpanel Monitor: Eizo FlexScan L23

Flatpanel monitors have continued to get bigger and cheaper over the past year. The last six months in particular have seen a huge increase in the number of flatpanels on the market.

When they first appeared, flatpanels were mostly produced by the larger manufacturers who already made notebook screens. Now, every monitor manufacturer has completed its range with a flatpanel.

However, a few stuck out from the crowd. One of our runners-up, the **Samsung SyncMaster 400TFT** with its 14.1in screen, impressed us not only by the quality of its image but also by the speakers being cunningly fitted into its conical base, and by the inclusion of a USB port (also on the base).



The second runner-up is the **NEC MultiSync 400V** (V for value). While this monitor is not as cheap as our winner, it is much less expensive than some other flatpanels. With a 14.1in screen, it has roughly the same viewable area as a 15in monitor, but it has a sharp image, an excellent horizontal viewing angle and a very small footprint.

The award for the Best Flatpanel Monitor goes to the **Eizo FlexScan L23**. Eizo has a range of flatpanelss and we saw this 13.8in display at the beginning of the year. We were impressed by the screen quality and it was one of the few flatpanels to have dual input, so you can attach it to more than one PC. Its recent and dramatic price drop also makes it extremely attractive.

PCW Details

Eizo FlexScan L23 £1,056.33 (£899 ex VAT). PDS 01483 719500

NEC MultiSync 400V £1,991.63 (£1,695 ex VAT). NEC 0645 404020

Samsung SyncMaster 400TFT £1,173.83 (£999 ex VAT). Samsung 0800 521652

p188 ➢

Best Scanner: Umax Astra 610P

1997 may have seen scanner prices fall, but this year they've absolutely plummeted. It's remarkable that you can pick up quite a respectable flatbed colour scanner for less than £100 (inc VAT). That's not to say that the scanner market has disappeared entirely at the budget end of the spectrum. There are still many decent mid-range and high-end products being released for those who demand a little extra.

There have also been some welcome developments in ease of use. Let's face it — most people aren't interested in adjusting gamma curve: they just want images on their PC with the minimum of fuss and effort. And this is exactly where our winner and two runners-up come in.

All three hail from quite different price ranges but all can be considered affordable and, most importantly, easy to use.

Our first runner-up comes from **Hewlett-Packard**. Its **ScanJet 6100C** is a doddle to use. This 600dpi SCSI model provides high-quality results quickly, and is supplied with a neat 35mm transparency adapter.

Much the same can be said of the superb **Agfa SnapScan 600**, part of a wide range to suit all budgets. Another 600dpi SCSI model, the SnapScan 600 is well built and performs like a dream.

Our winner is **Umax** for its **Astra 610P**, costing a remarkable £81.07 in its basic parallel interface model. It may not match our runners-up in terms of quality, but it takes the prize for sheer value for money. At that price, digital imaging is available to all.

PCW Details

Umax Astra 610P Price £81.07 (£69 ex VAT). IMC 01344 871329

Agfa SnapScan 600 Price £269.07 (£229 ex VAT). Agfa 0181 231 4906

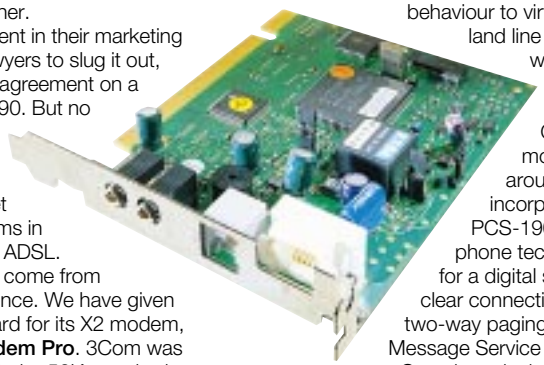
HP ScanJet 6100C Price £527.57 (£449 ex VAT). HP 0990 474747

Best Modem: Pace 56 Voice

Last year was the year of the great standards spat. Two competing 56K standards were produced, with 3Com and X2 in one corner, and Rockwell Lucent, K56flex and the vast majority of modem manufacturers in the other.

The two sides first sent in their marketing people and then the lawyers to slug it out, until the ITC finally won agreement on a single 56K standard, V.90. But no sooner had this been agreed than new speeds came up, including one that will let you run two 56K modems in tandem and, of course, ADSL.

Our two runners-up come from opposite sides of the fence. We have given **3Com** a runner-up award for its X2 modem, the **56K Voice Faxmodem Pro**. 3Com was the first to come up with the 56K standard and this modem continues the innovative approach, with good telephony functionality. Second runner-up is the **TDK Global Freedom 5660** which, with its ability to recognise and adapt its behaviour to virtually any land line in the world, is one of the best PC Card modems around. It incorporates PCS-1900 mobile phone technology for a digital service, clear connections, and two-way paging via Short Message Service (SMS).



Our winner is the **Pace 56 Voice**, the best-performing modem we've seen this year. It was designed from scratch to cope with 56K technology and performed well in all aspects, from installation to voice functionality, to the all-important download speeds. Pace has given *PCW* a sneak preview of the next generation of this modem, with enhanced telephony functionality, and we were impressed.

PCW Details

Pace 56 Voice £139 (£118.30 ex VAT). PMC 0990 561001

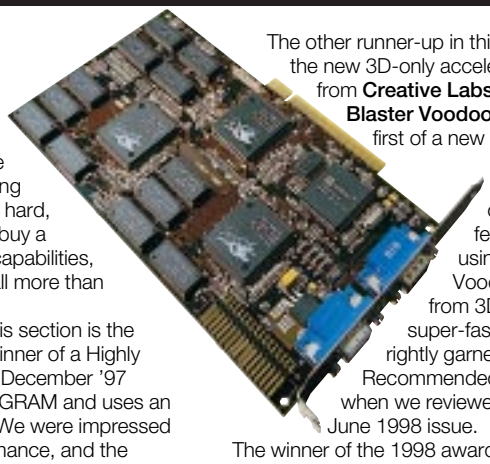
3Com X2 £139.83 (£119 ex VAT) 3Com 0800 225252

Global Freedom 5660 £209 (ex VAT) with GSM upgrades from £99. TDK 0118 921 6230

Best Graphics Card: ATI Xpert@Play

The graphics card market is the most turbulent sector of the computing industry. And when you think of the general pace of change in the PC world, that's saying something. These days it's hard, but just about possible, to buy a graphics card without 3D capabilities, and our three finalists are all more than proficient in that area.

The first runner-up in this section is the **Velocity 128** from **STB**. Winner of a Highly Commended award in our December '97 group test, it has 4Mb of SGRAM and uses an nVidia Riva graphics chip. We were impressed by both 2D and 3D performance, and the software drivers have an admirably comprehensive list of features.



The other runner-up in this category is the new 3D-only accelerator card from **Creative Labs**, the **3D Blaster Voodoo2**. This is the first of a new wave of 3D cards which will appear over the next few months using the Voodoo2 chipset from 3Dfx. This super-fast board rightly garnered a *PCW* Recommended award when we reviewed it in our June 1998 issue.

The winner of the 1998 award for Best Graphics Card is the **Xpert@Play from ATI**. The 4Mb card came out tops in our December 1997 group test with a combination of solid performance and superb value for money. The quality of the 3D images were particularly impressive, scoring a peerless 100 percent on our visual appearance test. Overall, it does everything you need at a price that won't send you running for cover.

PCW Details

Xpert@Play £109 (£93 ex VAT) ATI 01628 533115

3D Blaster Voodoo2 £229 (£194.90 ex VAT) Creative Labs 01245 265265

Velocity 128 £115 (£97.88 ex VAT) STB 0181 897 1003

p190 ➢

Best Sound Card: Terratec EWS64S

The past year has seen some interesting movements in the field of PC audio. With a sufficiently powerful main processor it is, in fact, possible to generate sound through software alone. Yamaha in particular has made some interesting developments in this field with its SoftXG software. Until this technology is proven, however, and super-fast PCs are the norm, audio capabilities currently remain in the hardware domain.

Most audio hardware on modern PCs are supplied as part of the main motherboard itself, but if yours is silent or just not cutting the mustard, it's time to consider a new sound card (*check out our annual group test on page 206*). Interestingly, the ageing ISA expansion bus used almost exclusively by sound cards today looks set to be superseded by PCI in the very near future. (Our winner and two runners-up still currently fly the old technology flag of ISA.)

Our first runners-up prize goes to the **Guillemot Home Studio Pro 64**, boasting a host of features which include digital I/O on a handy daughterboard.

Our second runner-up award goes to the ubiquitous **Creative Labs SoundBlaster AWE-64 Gold**, still going strong with foolproof 16-bit SoundBlaster support and a pain-free installation under Windows 95.

The winner is **Terratec** for its **EWS64S**, a cut-down version of the heavyweight EWS64XL. The S model is considerably cheaper and offers the same features, decent software and even an aluminium flight case.

PCW Details

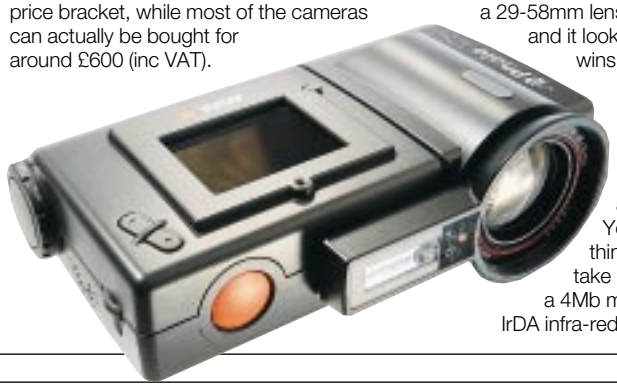
EWS64S £149.23 (£127 ex VAT)
Terratec 01600 772111

AWE-64 Gold £129.25 (£110 ex VAT)
Creative Labs 01245 265265

Home Studio Pro 64 £249.10 (£212 ex VAT)
Guillemot 0181 944 1940

Best Digital Camera: Agfa ePhoto 1280

Last year digital cameras were gimmicky gadgets which gave you poor-quality pictures that were difficult to download. This year they have improved out of all recognition — and the prices keep falling. The major improvement has been the introduction of mega-pixel cameras in the sub-£1,000 price bracket, while most of the cameras can actually be bought for around £600 (inc VAT).



The **Kodak DC-210** was the first of the mega-pixel cameras to become truly affordable. Building on the reputation of Kodak's existing range, notably the DC-50 and DC-120, the DC-210 has a mega-pixel CCD giving the camera a maximum resolution of 1160 x 864. The zoom lens is equivalent to a 29-58mm lens on a 35mm film camera and it looks great, too. For this, it wins a runner-up award.

The second runner-up is the **DSC-F1** from **Sony**. Among 640 x 480 pixel cameras it stands out as the best for image quality and superb functionality. You can twist the whole thing through 180 degrees to take pictures of yourself. It has a 4Mb memory, TV-out port and IrDA infra-red. In short, a fun camera.

This year's winner just had to be the **Agfa ePhoto 1280**. Not only is it a mega-pixel camera with a top resolution of 1280 x 1024, but it also has a 3X zoom lens, equivalent to a 38-114 mm lens on a 35mm film camera. The functionality of this camera is astonishing, letting you adjust every aspect of the image on the camera itself.

PCW Details

ePhoto 1280 Street price £616.88 (£525 ex VAT). Agfa 0181 231 4906

DC-210 Street price £527.58 (£449 ex VAT). Kodak 0800 281487

DSC-F1 Street price £457.08 (£389 ex VAT). Sony 0990 424424

Best Handheld Computer: Psion Series 5

It has been an exciting year in the world of handheld computers. We have seen the first Microsoft Windows CE 2.0 machine, the first colour displays and a new version of the 3Com Palm Pilot, the Palm III. Low-power software modems are becoming more common and the Microsoft Palm PC is just around the corner.

The first runner-up in this category is the **Palm Pilot Pro** from **3Com**. One of the sleekest, smallest devices around, it isn't hard to find plenty of people willing to rave about it. The Graffiti handwriting recognition system does away with the need for a keyboard and there is plenty of third-party software available.

The other runner-up in this section is the **620LX** from **Hewlett-Packard**. The first colour CE 2.0 machine to make it to the UK, it represents the cutting edge of handheld technology. The screen is superb and the keyboard is bigger than those of its rivals, giving it an edge for those who need to do a lot of typing.

The winner of this year's award for Best Handheld Computer is the **Psion Series 5**. It is the best piece of design we have ever seen on a computer. From the futuristic pen to the notebook-like keyboard, every part of the machine has benefited from the utmost care and attention to detail. The poor contrast of the touch-sensitive screen is a bit of a let-down, but as a total package, the Psion Series 5 cannot be beaten.

PCW Details

Series 5 £429.95 (£365.92 ex VAT; 8Mb version). Psion 0990 143050

620LX £799 (£680 ex VAT). Hewlett-Packard 0990 474747

Palm Pilot Pro £229 (£194.90 ex VAT). 3Com 0800 225252

p195 ➢

Best Suite: Microsoft Office 97 Professional

In the past twelve months we have seen the internet placed at the heart of the software suite. The first of our runners-up, Claris, impressed us with **ClarisWorks 5 Office**. It contains excellent net publishing software as well as a dizzying array of office document templates. It lacks some of the features available in the more expensive suites, but this slimmed-down office application is ideal for the small-to-medium enterprise due to its attractive price and range of applications tailored to the small business.

Our second runner-up, **Lotus SmartSuite 97**, battled it out for suite supremacy during 1997 and we particularly like the SmartSuite's team-friendly applications, designed to be used by multiple users over a network. SmartSuite reaffirms the use of the internet as an everyday office

resource by integrating it into almost every application in the suite.

The winner is the **Microsoft Office 97 Professional** suite, with several of its key applications having undergone substantial changes since Windows 3.1. This suite has made the leap to full web integration. We were impressed by the wizards used for creating HTML documents and the option to upload files to a web server. Separate applications like the drawing app, Visio, and Personal Information Manager have been dispensed with, to be replaced by a more cohesive approach that incorporates those features into the core applications.

PCW Details

Office 97 £483 (£411 ex VAT).
Microsoft 0345 002000

ClarisWorks 5 Office £116.33 (£99 ex VAT).
Apple Information Centre 0870 6006010

SmartSuite 97 £374 (£318 ex VAT)
Lotus 01784 455445

Best Creative Software: Adobe Photoshop 4

We have touched on different bases in this year's Creative Software awards: a high-end image processor, multimedia web authoring and a simpler, whacky, image-editing package.

This last piece of software, **Kai's Power Soap**, receives a runner-up award. It reflects a trend from last year for no-nonsense art packages aimed at the home user with a digital camera or scanner.

One of the leading lights in this market has been Kai Krause, and we were impressed by his latest product. It uses a beautiful interface, as user-friendly as it is pleasing to the eye. We loved the idea of the various prep rooms where artwork is given tone and colour before being realised in the finish room.

Our second runner-up is **MacroMedia's Director 6**. The easy-to-use, intuitive Behaviour Inspector that enables interactive scripting, and the optimisation of the

Shockwave plug-in for Java, are among the new features available in the new Director 6.

Adobe Photoshop 4 is a package that sets the standard by which others are judged, and it wins our award for Best Creative Software. The interface has been improved in all sorts of areas: this new version has an improved zoom facility, a thumbnail navigation palette, and right-mouse-button context menus.

A brilliant new feature is the introduction of Adjustment Layers, improving on the Layers feature from version three.

But some things only get better and Photoshop 5, reviewed in its beta form in the June '98 issue of *PCW*, improves still further on version 4.

PCW Details

Photoshop 4 £399 (£339.57 ex VAT).
Adobe 0181 606 4000

Director 6 £999 (£850 ex VAT RRP).
Computers Unlimited 0181 200 8282

Photo Soap £39.95 (£34 ex VAT).
Computers Unlimited 0181 200 8282

Accounting Software: MYOB

Accounting software is one of the few software packages no small business can be without. Whether you are a sole trader, a small company with only a couple of colleagues, or you employ 500 staff, the packages we have selected should cover all your basic needs.

The first runner-up is **TAS Books for Windows** from **Megatech**. It is aimed at small to medium-sized businesses and is the best bookkeeping package around. Its remarkably powerful data analysis and marketing analysis features make it equally desirable for any manager wanting to analyse sales in-depth.

As the best personal finance and sole trader package, **Microsoft Money Financial Suite 98** also wins a runners-up award. It has an account register where you record receipts and payments and analyse them to categories. It offers online banking services

with your bank whereby, via modem, you can electronically pay bills, download bank statements or transfer money between accounts. You can manage your investment portfolio and receive online share prices.

The award for best accounting package goes to **MYOB (Mind Your Own Business)**. It is ideal for the owner-manager and is good for bookkeepers, too. Navigation around the screens is fast, slick and logical, and non-accounting managers in particular will adapt to MYOB with ease. In terms of features and versatility it scores high marks in all areas. A superb all-rounder.

PCW Details

MYOB RRP £229.13 (£195 ex VAT); street price £135.13 (£115 ex VAT).
Bestware 01752 201901

Money RRP £39.99 (£34.03 ex VAT); street £37.60 (£32 ex VAT). Microsoft 0345 002000

TAS Books for Windows RRP £116.33 (£99 ex VAT); no street price.
Megatech Software 01372 727274

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Best Utility: WinZip 6.3

Utilities are the unsung heroes of computer software, and the first runner-up in this category is **Software Post-it Notes** from **3M**. A beautifully simple utility, it is essentially an information management tool. Entering information is like jotting something down on a physical Post-it Note with the additional benefits of storing all your notes on memo boards, setting alarms on individual notes, and a superb full test search facility.

The second runner-up is **Adobe Acrobat Reader**, which reads documents created in Portable Document Format. The beauty of it is that the documents look exactly the same no matter what platform you use. It is commonly used on the net, and our own *PCW* CD-ROM archives use the technology to exactly reproduce the printed page.

This year's Best Utility is **WinZip 6.3**, a compression utility that is so universal, people *expect* you to have it on your PC. Along with its own ZIP compressed file format, it supports a variety of popular file formats including TAR, GZIP and MIME, so you can use it to access most of the files you download from the net. And as if that were not enough, you can also use it to compress files — across several floppy disks if need be. This is one utility everyone should have.

PCW Details

WinZip 6.3 Shareware (see any *PCW* cover CD).

Acrobat Reader Free (see any *PCW* cover CD). Adobe 0181 606 4001

Software Post-it Notes £23.60 (£20.08 ex VAT). 3M 01234 229414

Best Game: Grand Theft Auto

This past year has been dedicated to sequels and add-ons. We had Hexen II, Quake II, Tomb Raider II and Riven, the sequel to Myst. Hexen II and Quake II also launched add-on mission packs: Quake's will be incorporated into Quake III later this year. Although good, we thought there were others that were a cut above them.

The first runner-up this year is **Microsoft's** strategy game, **Age Of Empires**, which is streets ahead of other strategy packages. The animation of characters and surroundings are incredibly detailed, and the gameplay is varied and exciting. We are looking forward to the release of Age Of Empires II later on this year.

Blade Runner, from **Virgin**, is our second runner-up. We loved the film, and the game does it justice. Blade Runner is a vast virtual experience with stunning graphics, ambient sound and speech, and more than 70 motion-captured characters. And the game recreates the atmosphere of the film with amazing style.

After hours of indecision and many arguments, the award for the best game of 1998 goes to **Grand Theft Auto**. This game gives life to every criminal thought you've ever had — but restricts it to the computer. You have licence to run riot, storm the streets in gas-guzzling monsters, deliver drugs, run over cops or shoot the driver in front of you.

Grand Theft Auto is the closest anyone has come to putting Goodfellas on the PC.

PCW Details

Grand Theft Auto £44.99
Take 2; 0171 384 7500

Age Of Empires £39.99. Microsoft 0345 002000

Blade Runner £44.99
Virgin Interactive 0171 368 2255

Best Reference/Home CD: Microsoft Encarta 1998 Encyclopedia DeLuxe Edition

CD-ROM has received its share of bad press over the years and this year has not been a good one, with publishing houses cutting back on staff and output. DVD threatens to sound the death knell of CD but 1998 still saw numerous excellent titles.

The first runner-up, **Dorling Kindersley's World Atlas**, has only just been released, but *PCW* saw it in beta some time ago and we were very impressed by its sheer innovation. It exploits all those new technologies found in new PCs, including PII, DVD and AGP, to create a virtual flyover of the world in gloriously-textured 3D, as well as including a wealth of supplementary information.

IBM World Books wins the second runner-up prize for its **Discoveries** titles. Not only does this hold a wealth of information on historical periods, but presents it in a new and exciting format that will fascinate all ages.

The best CD-ROM of the year is **Microsoft's Encarta 1998**. Just when you assume that Microsoft has created the ultimate CD reference title, it goes and produces something so much better than either its competitors or itself has given us before, that the whole package blows your socks off.

The **Deluxe** version comes on two CDs, with a study assistant on a third CD to help students keep track of their research. For both the quality and quantity of its content, it stands head and shoulders above the pack.

PCW Details

Encarta 1998 Deluxe £79.99 (£68.08 ex VAT). Microsoft 0345 002000

DK World Atlas £29.99 (£25.52 ex VAT). Dorling Kindersley 0171 753 3488

World Books Discoveries £59.99 (£51.05 ex VAT.)
IBM World Books 0990 426426

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Best Web Software: Progressive Networks' RealPlayer Plus

The winners in this category are releasing software that is opening up the internet to an increasingly wide audience, empowering web users everywhere.

E-commerce is something from which most organisations shy away, but with the release of Catalog 2.0, Actinic allowed those with less resources to set up shop on the net. Ideal for small businesses keen to take advantage of the net's myriad opportunities, it lets you trade using the free web space provided by ISPs.

These days it is relatively easy to create your own web site on the net, although making one that is worthwhile to visit is slightly more difficult. We were impressed by the user-friendly, drag-and-drop approach of Adobe's PageMill 3.0, which gets our

second runner-up award. We loved the ease with which you can flip between views, from word processor to web-page preview, at the touch of a button.

The winner is Progressive Networks' RealPlayer Plus. With RealPlayer installed on millions of PCs across the world, Progressive Networks is redefining the web's use and function. You can download a cut-down version from the internet for free, although RealPlayer Plus, currently at version 5.0, offers impressive extras. You can record your own audio and video content live from the web and listen to it later, offline, and improve sound and video connections with Perfect Play via its buffer system. You can even customise your own Timecast, a collection of audio and video news delivered to your Player every day.

PCW Details

Catalog 2.0 £410 (£348 ex VAT)
Actinic Software 01932 860524
PageMill £93 (£79 ex VAT)
Adobe 0181 606 4000
RealPlayer Plus $29.99 www.real.com

Best Web Site: BBC Online

Last year's PCW Awards divided this category into two sections: Best UK Web Site and Best Web Site Overall. This year, with the continuing homogenisation of global web-based culture, we have selected three sites from the millions that make up the net.

Runners-up this year come in the form of a truly useful site, Streetmap UK, and something to lighten your day, The Onion.

Streetmap shows innovative use of the net. Type in a London street name or postcode for a detailed A-Z style map, or a national OS grid reference or place name for an Ordinance Survey-style drawing of the locality.

The Onion, meanwhile, is the refuge of many an office worker looking for inspiration or just wanting to look busy when the boss passes by. Updated weekly, this spoof news site is guaranteed to have you crying with joy

from the moment you log on.

1997 was the year we saw the first change of government for almost two decades. The coverage of the developing campaign was recorded, deconstructed and analysed on the BBC's dedicated election web site, and for that it won a well-deserved runner-up award.

This year, however, the BBC site in general is rightly awarded our winner's accolade. This well-designed, easy-to-use and engaging site encompasses the whole of the corporation's output. It supplements its broadcast and printed products, and provides connected users with a value-added experience to enhance their enjoyment of the likes of This Life or Kevin and Zoe's Radio1 Breakfast Show.

PCW Details

BBC Online www.bbc.co.uk
The Onion www.theonion.com
The UK Streetmap Page www.streetmap.co.uk

Best Internet Service Provider: Demon Internet

The list of ISPs in the UK is growing by the day. Last year, this category was split into Best Content Provider and Best ISP. But as more ISPs are offering dedicated content, the distinction between the two becomes blurred; so, for our 1998 Awards, they are judged side by side.

Last year's PCW Awards highlighted the improvement in quality of general web standards, but what was said then is equally true today: "There is a level of garbage design out there that is intensely frustrating".

AOL, our first runner-up, is doing its best to eliminate this garbage. Its clear and easy-to-navigate interface, along with efficient, flexible, email and trial-run facilities, make it an attractive proposition for the first-time online user. Similarly, Pipex Dial, our second runner-up, operating under the umbrella of UUNet, gives users almost worldwide points of

presence through a global roaming facility, and 5Mb of free web space.

The winner of this category for 1998 is Demon Internet which, for £10 per month (ex VAT) offers 100 percent UK local call access on ISDN and standard lines. Five megabytes of free web space, unlimited email addresses and an extensive ftp site, make Demon Internet an excellent choice for personal and business users. Running its IRC server, it puts something back into the net for even non-members to enjoy. POP3 customers can collect their email via dedicated web pages, and its sponsorship of TPC's email-to-fax server gives email users worldwide fax for free.

PCW Details

Demon Internet £11.75 per month (£10 ex VAT) 0181 371 1000
AOL From £4.95 per month (VAT not applicable) 0800 3765432
Pipex Dial £14.98 (£12.75 ex VAT) 0500 474739

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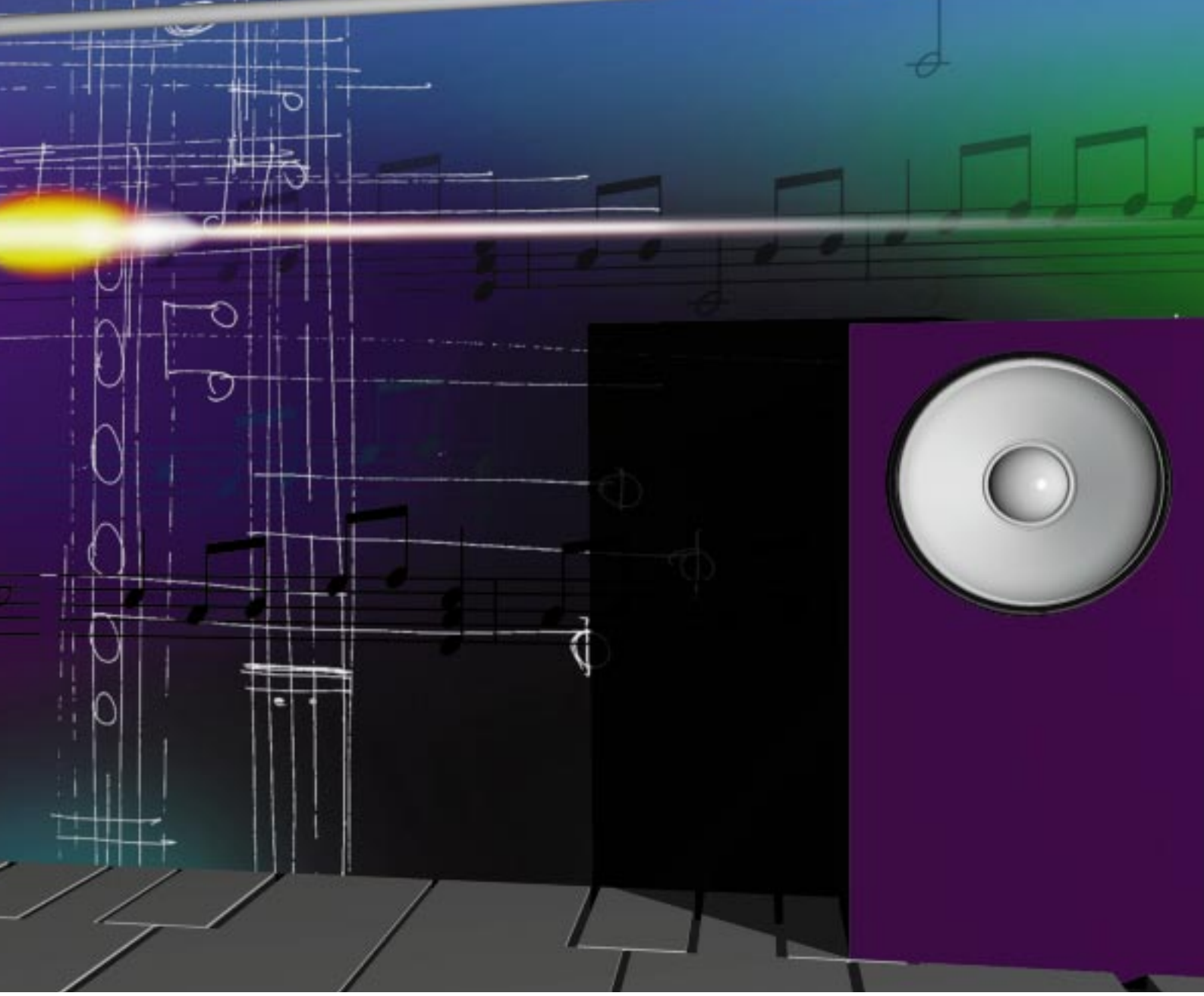
PCW Awards 1998: Full list of winners

BEST HIGH STREET RETAILER	PC WORLD	0990 464464	www.pcworld.co.uk
BEST SOFTWARE DEALER	SOFTWARE WAREHOUSE	01675 466467	www.software-warehouse.co.uk
BEST HARDWARE DEALER	SIMPLY COMPUTERS	0181 498 2100	www.simply.co.uk
BEST PC SUPPLIER (MAIL ORDER)	GATEWAY	0800 362000	www.gateway.com
BEST TELEPHONE SUPPORT	DELL COMPUTERS	01344 724872	www.dell.com/uk/
MOST RELIABLE PC MANUFACTURER	DAN TECHNOLOGY	0181 830 1100	www.dan.co.uk
BEST PC FOR BUSINESS	HEWLETT-PACKARD VECTRA VL	0990 474747	www.hp.com
BEST PC FOR HOME	MESH ELITE PROFESSIONAL PII	0181 452 1111	www.meshplc.co.uk
BEST BUDGET PC	LINEAR COMPUTERS LINEAR EXCEL	0800 622094	—
BEST NOTEBOOK	TOSHIBA SATELLITE PRO	01932 828828	www.toshiba.co.uk
BEST PERSONAL LASER PRINTER	PANASONIC KX-P6300	0500 404041	www.panasonic.co.uk
BEST BUSINESS LASER PRINTER	HEWLETT-PACKARD 4000TN	0990 474747	www.hp.com
BEST INKJET PRINTER	HEWLETT-PACKARD 720C	0990 474747	www.hp.com
BEST MONITOR	SONY MULTISCAN 400PST	0990 424424	www.sony-europe.com
BEST FLAT PANEL MONITOR	EIZO FLEXSCAN L23	01483 719500	www.eizo.com
BEST SCANNER	UMAX ASTRA 610P	01344 871329	www.imcnet.com
BEST MODEM	PACE 56 VOICE	0990 561001	www.pacecom.co.uk
BEST GRAPHICS CARD	ATI XPERT@PLAY	01628 533115	www.atitech.com
BEST SOUND CARD	TERRATEC EWS64S	01600 772111	www.terratec.co.uk
BEST DIGITAL CAMERA	AGFA EPHOTO 1280	0181 231 4906	www.agfahome.com
BEST HANDHELD COMPUTER	PSION SERIES 5	0990 143050	www.psion.com
BEST SUITE	MICROSOFT OFFICE 97 PROFESSIONAL	0345 002000	www.microsoft.com
BEST CREATIVE SOFTWARE	ADOBE PHOTOSHOP 4	0181 606 4000	www.adobe.com
BEST WEB SOFTWARE	PROGRESSIVE NETWORKS REALPLAYER PLUS	—	www.real.com
BEST ACCOUNTING SOFTWARE	BESTWARE MYOB	01752 201901	www.myob.co.uk
BEST UTILITY	WINZIP 6.3	—	www.winzip.com
BEST REFERENCE / HOME CD TITLE	MICROSOFT ENCARTA 1998	0345 002000	www.microsoft.com
BEST GAME	GRAND THEFT AUTO	0171 384 7500	www.bmginteractive.com
BEST INTERNET SERVICE PROVIDER	DEMON INTERNET	0181 371 1000	www.demon.net
BEST WEB SITE	BBC ONLINE	—	www.bbc.co.uk

Stop, look **listen**

You and your PC can make sweet music together: you'll need a sound card and some software to get the best from it. Steven Helstrip reviews a range of products designed to make a musician out of you.



Sound cards are essential if you want to get the most from today's games and multimedia applications. However, SoundBlaster-compatibles are no longer cutting edge, nor up to the job. As PCs continue to plummet in price as their specifications near that of high-end workstations, so something similar is happening in the sound-card market.

If you've ever dreamt of setting up a home studio but thought it would be too expensive, think again. For around £150 you could kit yourself out with a high-quality WaveTable synthesiser, a sampler, audio and MIDI recording software and still have support for all your favourite games with change left over.

For this year's annual round-up of sound cards we've focused on the best packages for making music on your PC; from complete studio solutions to professional, yet affordable, multi-output cards. Gamers shouldn't be put off, though, as we've also tested the latest PCI 3D accelerator cards to meet the demands of tomorrow's games. And, we take a look at emerging software-based synthesisers that could one day replace sound cards altogether.

Software technology has greatly improved and now anyone can compose, edit and master their own CDs without having to worry about expensive studio time. We've taken a look at some of the most popular packages to appeal to all skill levels, and explained how sound cards work to help you get the most out of them.

● *For a practical guide to making music, see our MIDI workshop on p232 and the Hands On Sound column on p293.*

Ratings

★★★★★	Buy while stocks last
☆★★★★	Great buy
☆☆★★★	Good buy
☆☆☆★★	Shop around
☆☆☆☆★	Not recommended

Sound cards Contents

ILLUSTRATION BY Daniel Mackie

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How sound cards work

Before we look at the techniques that sound cards use to do their stuff, let's first recap on the physics of sound, which is key to understanding how digital audio and WaveTable works.

When two or more objects collide, they release waves of energy into the air around us. Sound waves travel in all directions from the disturbance, like the ripples produced when a raindrop falls into a puddle, which in turn produces changes in air pressure. Our brain interprets these changes as sound through sympathetic movement of the ear drums.

Subtle changes in air pressure created from, say, a pin hitting the floor, can just about be heard. But you can often feel the trembling waves that follow a jet aeroplane as it is taking off, and you can even see them if you place a candle in front of a loudspeaker.

When sound is recorded through a microphone, the changes in air pressure cause the microphone's diaphragm to move in a similar way to that of the ear drum. These minute movements are converted into changes in voltage which can be stored magnetically on tape, or as digital information on a computer's hard disk when processed by a sound card's ADC (analogue-to-digital converter).

Fig 1 The finer the steps, the better the digital approximation of the original analogue sound

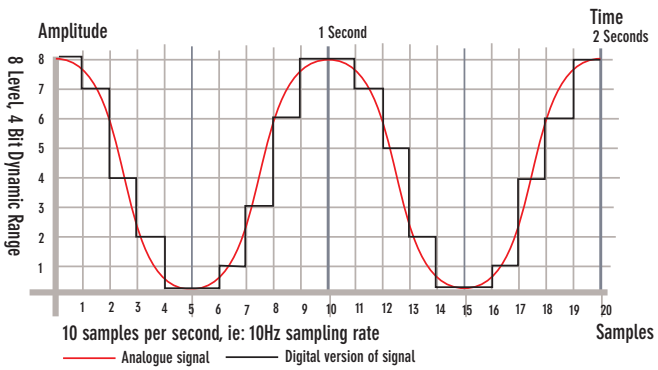
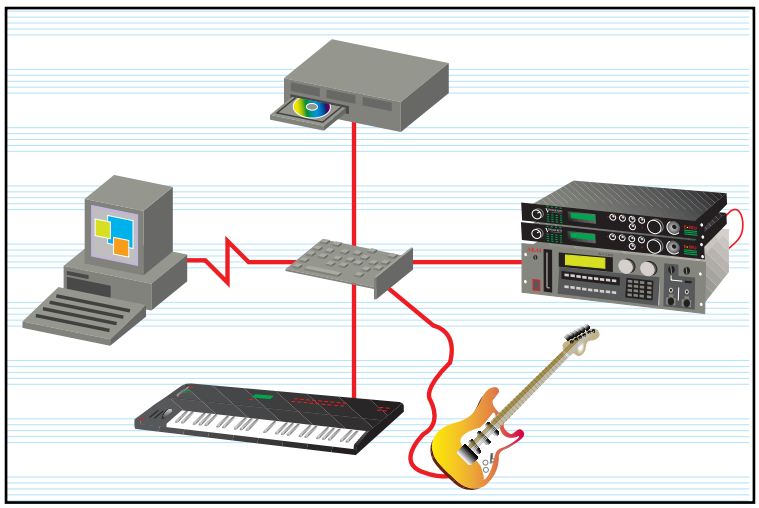


Fig 2 MIDI allows you to connect together many musical instruments and your PC



Sampling

The process of recording digitally is known as sampling. The ADC's job is to take "samples" of the incoming sound many times per second in order to generate a digital representation of its waveform (Fig 1).

Two factors determine the accuracy, and therefore the quality, of the recording: the resolution at which amplitude (or the height of the waveform) is measured, and the rate at which samples are taken. The current crop of sound cards can sample in stereo up to 48kHz in 16-bit resolution, although the standard for both CD and digital audio within games is 44.1kHz, which is why sound-card manufacturers often refer to their products as being "CD-quality".

When it comes to playing back a sample, a digital-to-audio-converter (DAC) converts the binary information back into an analogue voltage. This is amplified many times before appearing as sound from a loudspeaker, which in turn vibrates, causing changes in air pressure.

WaveTable

The second method sound cards use to play audio employs an on-board synthesiser. Although FM synthesis is still widely supported to provide compatibility with older games, newer titles use more realistic WaveTable synthesis. Whereas FM creates sound by mixing basic waveforms to reproduce something that might vaguely resemble a flute, WaveTable plays back samples of the real instrument.

ISA-based cards generally store samples in ROM, although newer and cheaper PCI products use your PC's main system RAM. These banks are loaded when Windows starts up and can theoretically be modified by games developers to include new sounds. WaveTable banks store up to 700 instrument samples within 1, 2, 4 or 6Mb. This doesn't necessarily mean there will be 700 instruments to play with, though, since instrument patches are made up of several samples to improve their quality.

In real life, instruments produce subtly different tones depending on how they are played. For instance, when a piano is played softly, you don't hear so much of the hammers as they hit the strings. When played harder, not only can you hear the keys and hammers strike, but there are changes in tonal quality as every other string begins to vibrate, or resonate. Instruments also produce differing tones over a range of pitches.

To reproduce these qualities more accurately with WaveTable synthesis, a greater number of samples and additional processes are required. Some cards use tone filtering to change the way instruments sound at differing levels, and Creative Labs, with its software-based WaveSynth, has adopted Physical Modelling. This is a technique some professional keyboards use to further enhance realism by mathematically modelling, say, the differences in tone that are produced when a guitar is plucked as opposed to being strummed.

Digital effects also enhance the card's quality. These include reverb and chorus algorithms which are calculated by on-board DSPs (digital signal processors). Reverb adds a room quality to a sound, giving the impression that it's being played in, say, a large open space such as a church hall. Chorus is used to add body, or depth, to a sound. It works by continuously varying the speed of a delayed second signal which, when mixed with the original, "thickens" the tone to sound as though more than one instrument is playing.

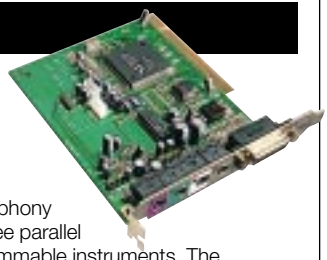
MIDI

Musical Instrument Digital Interface (MIDI) (Fig 2) is the protocol over which synthesisers and other MIDI-compatible instruments can be configured and played from a remote device such as a MIDI keyboard or MIDI file. MIDI doesn't transmit sound, just simple 7-bit "events". A sequence of events might instruct the synth to first select a violin on channel 1, then play middle C for two bars followed by a string of other notes. Each "note on" event contains a velocity value to relay how hard the "key" should be struck.

MIDI provides 16 independent channels over which instruments can communicate, and providing the synth has sufficient MIDI implementation, almost any of its parameters can be "tweaked" in real-time from a MIDI sequencer. This enables programmers to "shape" the way instruments sound and enables effects to be modified.

To ensure accurate playback of MIDI files, sound-card manufacturers adopted the General MIDI specification. This lays down a minimum set of requirements for the synthesiser chip, including a standard set of instruments mapped to specific program numbers and the minimum number of voices to be supported. These specifications are often far exceeded by today's cards.

Aztech PCI-128 Wave



The PCI-128 offers hardware and software synthesis based on a 2Mb WaveTable ROM and Yamaha's S-YXG50 softsynth. The S-YXG50 provides incredible 128-voice polyphony (if you have a fast enough PC), three parallel 24-bit effects and 676 fully-programmable instruments. The on-board WaveTable doesn't come close in terms of sound quality, but is compatible with DOS-based General MIDI drivers and is not quite so processor intensive. SoundBlaster and AdLib are supported within a DOS box for older games.

The installation ran first time and includes a taskbar configuration utility for SRS stereo enhancement which, although very effective, introduces a great deal of noise on the output. The softsynth is supplied with an XG MIDI player and can be set up to provide between 24 and 128 voices, depending on your hardware. The card is full-duplex and can mix independent sample rates up to 48kHz. There are connectors for mic and line in as well as speaker and line outputs. Internal connectors provide TAD, auxiliary and CD audio inputs.

Bundled software includes Voyetra's MIDI Orchestrator Plus, AudioStation and a mixture of sound-related utilities. Although the Aztech card will work with a Pentium 166MHz, a 200MHz MMX is recommended for real-time playback of the softsynth. If you're not planning on using this card for sequencing, this should not be an issue.

PCW Details

Price £70.44 (£59.95 ex VAT)

Contact Aztech 0181 400 9043 www.aztech.co.uk

Good Points Yamaha's Softsynth. Reasonable price.

Bad Points Very noisy output.

Conclusion Read on…

★★☆☆☆

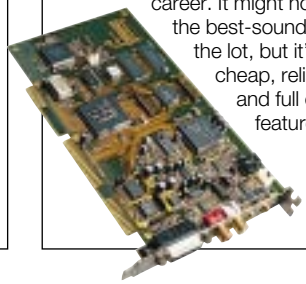
Creative Labs AWE-64 Gold

Personal Computer World Highly Commended

The AWE-32 paved the way for many of today's audio cards, bringing sampling capabilities, WaveTable synthesis and digital output into the mainstream. Its successor, the AWE-64, adds an additional 32 voices with its WaveSynth/WG software synthesiser, 4Mb of sampling RAM and a much cleaner output, though not the best. The WaveSynth generates greater realism than the instruments stored in its 1Mb ROM, but is a drain on resources and requires a Pentium to run. Because it uses the wave channel to output sound, it will have to be disabled if you want to run audio applications like Cubase VST.

A digital output connector, for use with the synthesiser only, is supplied on a blanking plate which connects to jumpers on the card. A MIDI adaptor kit is also included. Setting up the card takes no time at all and installs a generous suite of applications including a MIDI sequencer, wave editor, sample bank editor and a host of internet audio tools. Additional software includes three General MIDI sound banks, voice recognition and text-to-speech utilities.

The AWE-64 Gold is a good all-round performer. Games compatibility isn't an issue, and there's plenty on offer to kickstart your music-making career. It might not be the best-sounding of the lot, but it's cheap, reliable and full of features.



PCW Details

Price £129.25 (£110 ex VAT)

Contact Creative Labs 01245 265265 www.cle.creaf.com

Good Points Includes MIDI interface and does everything.

Bad Points Proprietary RAM. No daughterboard connector.

Conclusion Cheap-and-cheerful solution for basic gaming and music requirements.

★★★★☆

Diamond Monster Sound PCI

Based on Aureal's A3D technology, the Monster Sound PCI is designed to work in parallel with your existing sound card to provide accelerated Direct Sound and positional 3D audio. More and more games are supporting A3D, which is likely to catch on as a new standard. It will also work as a standalone card, although there is no support for legacy DOS software.

The WaveTable synth resides on a daughterboard and provides 32 voices from 2Mb ROM with digital effects. There are internal connectors for CD and auxiliary inputs as well as a proprietary modem socket for PC telephony. The rear panel has a line input which would be used to connect your existing card (cable provided), a mic input and two line outs for enhanced four-speaker surround sound.

The card installed first time around and includes a taskbar utility with A3D demos. There are no music applications bundled; instead you get full versions of Outlaws, Sim Copter and Tiger Shark that make use of 3D audio.

Given the range of cards that now support both A3D and SoundBlaster, I can't see why anyone would choose this card which now appears outdated. The WaveTable synth is nothing out of the ordinary and there are no additional features for your money. Apart from the games, of course.

PCW Details

Price £129.25 (£110 ex VAT)

Contact Diamond Multimedia 01189 444400 www.diamondmm.com

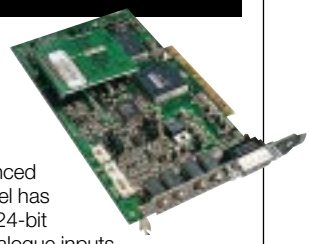
Good Points Smooth installation. A3D compatible.

Bad Points No SoundBlaster support. Overpriced.

Conclusion Cannot compete with the competition.

★★☆☆☆

Event Electronics Gina



The Gina is a pro-standard two in, eight output, PCI-based digital audio card for use with direct-to-disc recording applications. It is supplied with an audio breakout box that provides 0.25in jack connectors for balanced input and unbalanced outs. The rear panel has phonos for SP/DIF digital I/O capable of 24-bit recording and playback up to 48kHz. Analogue inputs will sample up to the same rate in 16- or 20-bit resolution for crystal-clear audio. Input gain is adjustable by half-decibel increments using the standard Windows 95 mixer applet. Alternatively, you can enable EasyTrim to provide automatic gain adjustment to ensure you use the full 20-bit dynamic range.

The card installed without any problems and provides a utility to test your PC's audio performance. A special version of Cool Edit Pro is included in the package, which retains most of the functionality of the full application but lacks the DSP processing and 64-track capability. There are also demos of Cubase, SoundForge and Waves' DirectX plug-ins.

Audio quality is stunning and noise is barely noticeable. With a 98dB dynamic range, this card is ready to take on any job, from the home studio right up to professional applications.

For less money, the Darla version provides much the same functionality but doesn't include the breakout box or digital I/O.

PCW Details

Price Gina £499.38 (£425 ex VAT), Darla £299.63 (£255 ex VAT)

Contact Key Audio 01245 344001 www.event1.com

Good Points Sound quality. Price.

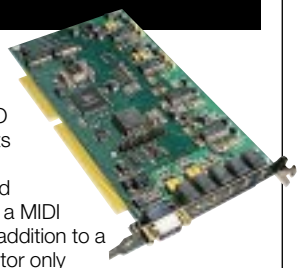
Bad Points Cable to breakout box could be longer.

Conclusion Stunning quality at an equally stunning price

★★★★☆

p210 ➢

Gadget Labs Wave/4



If you're planning to use your PC as a virtual studio for recording, say, a live band, then you'll need a multi I/O card. The Wave/4 has two stereo inputs and two stereo outputs to provide four independent channels for recording and playing back digital audio. There's also a MIDI interface providing in, out, and thru, in addition to a daughterboard connector. The connector only supports mini cards, though, which excludes the Yamaha DB50XG. Two cards can be installed to give eight in and outs, which are synchronised via the drivers. All inputs and outputs can be used simultaneously and appear in audio applications as individual cards.

Round the back, the card's got a line out for the WaveTable option, four mini stereo jacks and a D-type connector for MIDI. A MIDI adaptor kit is included, as are four jack-to-phono converters. All sampling rates up to 48kHz are supported and the card has a signal-to-noise ratio greater than 93dB. To ensure glitch-free recording, the card features a 64Kb static RAM cache.

The Gadget card installed first time and instructions are given to optimise its performance for use with popular sequencers including Cakewalk and Cubase VST. We tested the card with the latter and found that it does exactly what it says on the box.

PCW Details

Price £269.08 (£229 ex VAT)

Contact Et Cetera Distribution 01706 228039, www.gadgetlabs.com

Good Points Good sound quality. Low noise.

Bad Points Daughterboard connector.

Conclusion A good-quality multi I/O, although you don't get a lot for your money.

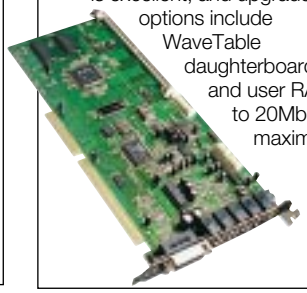
★★★½☆

Guillemot Home Studio Pro 64

Personal Computer World Highly Commended

If you're setting up a home studio, you'll find much of what you need here. This is an impressive card, based around the Dream chipset, offering a complete 16-track direct-to-disc recording suite. For sequencing there's a MIDI adaptor kit, high-quality 64-voice WaveTable synth with user sample support, real-time four-band paragraphic EQ and digital effects for all audio sources. A second daughtercard provides gold-plated phono connectors for line in/out and SP/DIF digital I/O. This does not require an additional slot and connects to the main board via a ribbon cable. The installation caused problems initially but a clean installation of Windows did the trick and we were soon sequencing.

Support is provided for all major sound standards, including DirectSound 3D and SoundBlaster emulation in Windows and DOS modes. The main board has line and mic inputs and two line outs for four-speaker positional audio. A utility is supplied with configurations for many current games titles and is good for 800 user presets. Bundled software includes proprietary Quartz Audio Master for audio and MIDI sequencing, a sample bank manager and Cakewalk Express. Audio quality is excellent, and upgrade options include WaveTable daughterboard and user RAM to 20Mb maximum.



PCW Details

Price £249.10 (£212 ex VAT)

Contact Guillemot 0181 944 1940 www.guillemot.com

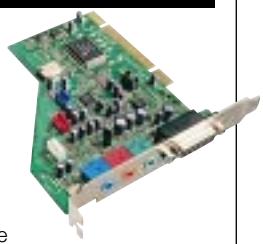
Good Points Price. Professional spec. Intuitive software.

Bad Points 44.1kHz maximum sampling rate.

Conclusion High-quality board for music production. Not to be overlooked.

★★★★½

Orchid NuSound 3D



The NuSound is based on Aureal's Vortex chipset to provide up to 64-voice WaveTable synthesis and A3D Interactive positional audio, which looks set to become the standard for Win95 games. The hardware installed with no problems, although DLLs were missing for the A3D demos, as were three games which are supposed to be included in the package. We eventually found the missing DLLs and finished the installation manually, but we are still searching for the games.

Successfully-located applications were supplied by Voyetra and include MIDI Orchestrator, Audio Station and a rather disappointing range of utilities that we would have expected to see bundled with cards three years ago. However, there's full SoundBlaster support in Windows and DOS modes, for older games.

The Orchid card has internal connectors for CD audio, auxiliary, and video devices such as DVD. A Tad port enables compatible modems to be connected to provide two-way telephonic communications. Round the back there's the usual complement of connectors for speaker output, mic and line in. These are colour-coded, which is a great help when you're crouched behind your PC trying to remember which lead plugs in where. We weren't blown away by the WaveTable synth, which lacked any depth, but the digital audio output was clean and noise free.

PCW Details

Price £49.35 (£42 ex VAT)

Contact Orchid 01256 479898 www.orchid.com

Good Points Cheap. A3D compatible.

Bad Points Poor software

Conclusion Good card for the money, shame about the software.

★★★½☆

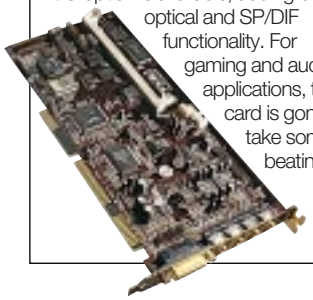
Terratec EWS64 S

Personal Computer World Editor's Choice

Whereas the EWS64 XL (*p212*) is geared to pro-audio applications and has games compatibility, the 64S is primarily a games card with some pro-audio features. Like the XL, it shares the same sampling capabilities (and much of the same software) and offers hardware-accelerated DirectSound and Direct3D. The synth/sampler provides up to 64 voices with real-time digital effects for all audio sources, and there's 2Mb of WaveTable RAM, expandable to 64Mb.

The 64S was the only card to arrive in an aluminium flight case. Installation was successful first time around, setting up all that's needed including a copy of Cubasis AV for combined MIDI and audio sequencing. Also on the accompanying CD are demos of Cubase VST, ReBirth, squillions of samples and no less than 40 shareware audio utilities. The sound quality is better than any other card in this price range and although the GM sound set isn't groundbreaking, additional banks, which can also be found on the CD, can be downloaded if you install extra SIMMs.

Round the back there are two line outputs for four-channel sound, mic and line inputs. A digital I/O option is available, adding both optical and SP/DIF functionality. For gaming and audio applications, this card is gonna take some beating.



PCW Details

Price £149.23 (£127 ex VAT)

Contact Terratec 01600 772111 www.terratec.co.uk

Good Points Price. See review for the rest.

Bad Points We looked for some but failed.

Conclusion Nothing comes close at this price.

★★★★★

PCI cards and software synthesisers

The first generation of PCI cards is now coming to light and will provide enhanced features and performance for both gaming and music applications. But why PCI?

As greater demands are made on audio processing, traditional cards fall short due to the physical constraints of the ISA bus. The problem is bandwidth. The ISA bus can only throughput 7Mb of data per second, compared with 133Mb over the PCI bus. This limits audio to just 16 channels — more than enough for any game. But for professional audio applications, 32 (or better, 64) channels are preferred. Some ISA cards implement proprietary technology to increase throughput, but it's in everyone's best interests that the industry moves towards a standard.

PCI-based cards deliver greater performance. Due to high overheads inherent with ISA technology, it is estimated that up to 20 percent of a CPU's capacity can be blocked when playing a 16-bit stereo sample at 44.1kHz. PCI significantly reduces the performance bottleneck, freeing up the CPU.

Perhaps the greatest gain for the consumer is a sharp drop in price for a basic gaming card that has increased functionality over traditional SoundBlaster-compatibles. Due to PCI's high bandwidth, WaveTable sample banks can be stored in main system memory so there's no need for expensive ROM chips, but you're left with less memory. This is not to say that all PCI cards will work in this way. Aztech's PCI-128 Wave provides both hardware and software WaveTable technology, and Yamaha is developing a high-end XG card with a 20Mb WaveTable ROM.

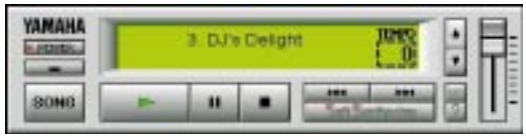


Fig 1 (top) Yamaha's virtual synth sounds and looks real
Fig 2 (above) ReBirth's great for creating dance music

DirectX

Microsoft's role in this has been the development of DirectX drivers, which includes DirectSound and Direct3D. This enables software developers to write directly to any DirectX-compatible sound card with multiple audio streams, while utilising 3D audio effects. Each audio channel can be treated individually, supporting multiple sample rates and the ability to add software-based effects.

In the past, individual sound cards were written for specifically, and not all were compatible. Now, though, the SoundBlaster's register set is widely supported by sound-chip vendors and is unlikely to disappear overnight.

So should you rush out and buy a PCI card? Our advice is, not yet. From the cards we have seen, none have excelled in all areas. There will be no shortage of options over the coming year though, as the industry moves towards a better standard.

Software synthesisers

A software-based synthesiser uses your PC's CPU to generate tones in real-time. But we're not just talking basic FM waveforms here. Both Yamaha and Roland have implemented full XG and Sound Canvas emulation respectively. Not only are all the instruments software-generated, but the effects are, too.

Yamaha's S-YXG50 can provide up to 128 voices with selectable playback frequency up to 44.1kHz. Although a 200MHz Pentium is recommended, it will run on a basic 166MHz with 16Mb RAM. The software provides an XG MIDI player (Fig 1) and a virtual MIDI device driver. There is some delay when playing instruments in real-time from a MIDI keyboard, but playback is solid from a MIDI file and the quality is stunning.

The playback comes through your sound card's wave channel, or DAC. If you have a high-quality card there's no reason why it shouldn't sound every bit as good as the DB50XG daughterboard. A 90-day demo is available from Yamaha's web site and you can download a cut-down version, the SYG20, for slower machines. The SYG20 is limited to 32 voices and 22kHz playback, but it still far outstrips the WaveTable ROMs supplied with many sound cards.

Other software-based synthesisers, like ReBirth 338, mathematically model the characteristics of vintage analogue synths, which are highly sought-after among the dance fraternity. ReBirth provides two virtual Roland TB-303s and two drum machines (Fig 2). All the knobs and dials work in real-time, affecting the tone and shape of the sounds. A sequencer is built-in to each module and there are digital effects to hand, including delay and distortion.

You can synchronise ReBirth to a MIDI sequencer, literally adding four virtual instruments to your collection. Several shareware clones are available on the internet. Check out Rubberduck, which additionally provides two audio channels for playing sampled loops.

PCW Contacts

ReBirth www.propellerheads.se

RubberDuck, Virtual Sound Canvas and other soft synths http://sorry.vse.cz/maz/synths.html

Yamaha S-YXG50 www.yamaha.co.uk/

Glossary

ADC (Analog to Digital Converter)
A device that takes an analogue signal and converts it to numerical digital data.

Chorus
A doubling effect used to enhance sound.

CODEC
Single chip ADC/DAC with analogue mixer.

DAC (Digital to Analog Converter)
The reverse operation of an ADC.

DSP (Digital Signal Processor)
Used for calculating effect algorithms.

FM (Frequency Modulation)
Old technique for synthesising instruments but still widely supported to provide compatibility with older items.

Full Duplex
A card that can record and playback digital audio simultaneously.

Gain
Input or recording level.

GM (General MIDI)
A specification enabling MIDI files to be played back correctly on any GM-compatible synthesiser.

MIDI (Musical Instrument Digital Interface)
Protocol for instruments to communicate over 16 independent channels.

Multi-Timbral
The number of simultaneous instruments a synthesiser can play.

Polyphony
The number of voices a synthesiser can play at any one time.

Sequencer
Software for recording and editing MIDI files.

SP/DIF (Sony Philips Digital Interface)
A protocol for transferring audio digitally.

WaveTable
A bank of instrument samples stored in RAM or ROM.

XG
Yamaha's extension of General MIDI that provides many instrument variations and more digital effects. Many instrument parameters can be controlled in real-time.

p212 ➢

Terratec EWS64 XL

It's difficult to know where to begin with this card — there's so much to talk about. As well as offering full games and DirectX compatibility, the EWS64 XL has all the features for music production you could ask for. It has not just one digital output, but two. And it's got both SP/DIF and optical digital inputs, too. With two MIDI interfaces and two stereo line inputs/outputs, we have here a potentially seriously desirable card.

To support these features, the card has a front panel that fits in a 5.25in bay to provide a headphone socket, MIDI and digital I/O. Inside there's a daughterboard connector for an additional synth. The onboard synth/sampler has 6Mb RAM (expandable to 64Mb) and provides up to 64-voice polyphony. DSPs provide real-time digital effects for all audio sources and, in principle, hardware mixing for up to 32 stereo channels.

Sample editing and sample bank management rivals that of professional samplers, enabling up to 64 keyboard splits, velocity switching and 24dB resonant filters. With all this, and the rest, we were expecting conflict nightmares. We were wrong. Plug-and-play saved the day and we were up and running in less than five minutes. Sound quality is superb, though not as rich as the Pinnacle (*alongside*), and the software implementation and design is very powerful, if a little intimidating.

PCW Details

Price £399.50 (£340 ex VAT)

Contact Terratec 01600 772111 www.terratec.co.uk

Good Points Cascadable. Excellent software. Sound quality.

Bad Points Price is a tad steep when you compare the spec to the EWS64 S.

Conclusion Nothing else offers this much at this price.

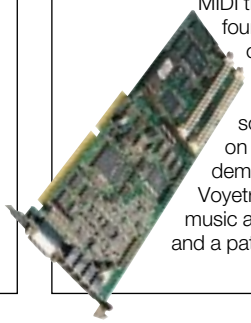
★★★★☆

Turtle Beach Pinnacle

This is Turtle Beach's top-of-the-line card, featuring pro-standard WaveTable synthesis, daughterboard connector, sampling capabilities and digital I/O option. The installation ran first time on our test machine under a plug-and-play configuration. Two IRQs are required (three if you enable the EIDE interface), in addition to a 32Kb block of upper memory and three I/O ranges. Although it's heavy on resources, CPU usage is minimal due to the cards's Hurricane architecture that pumps audio through, up to eight times faster than DMA-based cards such as the AWE-64.

There's no support for DOS games, but under Windows this card really performs and is best suited to audio applications. You can forget noise issues: the Pinnacle is so quiet, you won't know it's plugged in. The 4Mb Kurtzweil synth is lush, and up to 48Mb can be installed for additional samples. The 20-bit analogue/digital converters are clean, equalling those of professional samplers.

The Pinnacle's sampling software is disappointing and doesn't let you tweak the basic synth parameters like filters and LFOs. Applications include Digital Orchestrator SE, which provides effects processing, unlimited MIDI tracks and four audio channels. There are 24Mb of sound banks on the CD, demos of Voyetra's range of music applications and a patch librarian.



PCW Details

Price £448.85 (£382 ex VAT), or £498.20 (£424 ex VAT) with digital I/O option

Contact Et Cetera Distribution 01706 228039 www.tbeach.com

Good Points Overall sound quality is second to none.

Bad Points Disappointing software support.

Conclusion If audio quality is your main concern, look no further.

★★★☆☆

VideoLogic SonicStorm

This is VideoLogic's début sound card and was one of the first PCI audio solutions. Based on the Maestro-1 processor, the Sonic Storm can handle up to 64 audio channels and provides acceleration for DirectSound and DirectSound 3D. Its 2Mb WaveTable bank is stored in main system memory, keeping its price low, while the DSP provides digital effects and 64-voice polyphony. The quality of instruments is disappointing, but given that games are moving away from WaveTable sounds in favour of CD and sampled audio, this is becoming less of an issue. The Sonic Storm provides SoundBlaster support for DOS-based games, providing they run under Windows. We experienced MIDI timing instability in this mode, however, which resulted in the music sounding jumpy. There were no problems with DirectX applications.

First attempts at installing the card proved fruitless. Swapping the card to another slot solved the problem and we were in. All software and help files are accessed using a web browser, which simplifies the process and provides links to VideoLogic's home page for updated drivers. Bundled software includes a trial version of Dance eJay (*see page 293, this issue*), Midisoft Studio Lite and MixMan's 3-Mix, which lets you be a virtual DJ. The card has internal connectors for video, a PC speaker and an auxiliary input. All in all, a reasonable games card.

PCW Details

Price £48.18 (£41 ex VAT)

Contact VideoLogic 01923 260511 www.videologic.com

Good Points Price. Reduced CPU load over ISA cards.

Bad Points Poor sound set and unstable SoundBlaster support

Conclusion Well-equipped games card for newer items.

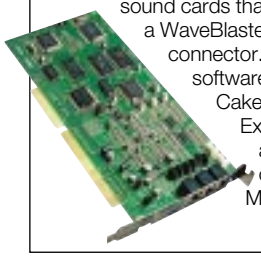
★★★☆☆

Yamaha SW60XG

Even though this card has been around for nearly two years, few sound cards have come even close to matching its high-quality WaveTable sounds. Based on Yamaha's XG chipset, which can be found at the heart of professional synthesisers in studios all over the world, the SW60XG provides a 32-voice polyphonic synth with three parallel 24-bit DSP effects. With 676 voices and 21 drum kits stored in 4Mb ROM, a rich and full sound is produced, with greater realism than any other all-in-one solution.

The SW60XG is a WaveTable card only and is intended for use alongside your existing sound card. With no digital audio or whizzy 3D enhancements, it requires no IRQs and is therefore a breeze to set up. Your existing card connects to the line input, enabling both to be heard simultaneously. Disappointingly, the relevant cable is not supplied. You'll also find a microphone connector round the back, which can be routed through the internal DSPs to be enhanced by one of 64 effects. These include reverbs, choruses, delays and pitch-shift algorithms.

When using the effects with an external device (mic or line input; any will do) the synth is reduced to 30 voices. The daughterboard equivalent, the DB50XG, is compatible with sound cards that feature a WaveBlaster connector. Bundled software includes Cakewalk Express and bags of XG MIDI files.



PCW Details

Price £149.23 (£127 ex VAT)

Contact Yamaha 01908 366700 www.yamaha.com

Good Points Quality and depth. 18-bit resolution.

Bad Points Hmmm… 64 voices would have been better.

Conclusion If you're looking for high-quality WaveTable sounds and already have a sound card, buy an SW60XG, now.

★★★★☆

p214 ➢

Sequencing and audio software

To make music with your PC, you'll need a sequencing package. Sequencers let you record and edit MIDI and digital audio in a variety of ways and are now easier to use than ever. Nearly every sound card in this group test came with a sequencer, and although mostly cut-down versions of professional packages, they provide more than enough functionality to create a masterpiece.

To get the most from a MIDI sequencer, you need a MIDI keyboard to play-in the parts. They start from around £70 and connect to your sound card using a MIDI adaptor kit (around £15). If you don't want to splash out on a MIDI keyboard, multimedia has brought dozens of applications that will work with just your PC's keyboard and a mouse. Many require no musical knowledge to get great results and can encourage children to take an interest.

The best thing about music applications is that they don't require the latest and fastest PCs to run. A 133MHz Pentium with 16Mb RAM will suffice and any 16-bit sound card can be used. High-end audio sequencers like Cubase VST are the exception. As they rely on the CPU to calculate real-time digital effects, a 200MHz Pentium fitted with 64Mb is recommended. Given the size of digital audio files, a fast hard drive is also important for solid playback of multiple tracks.

Here we have rounded up a selection of music applications for all skill levels. And in our Hands On Sound column (*p293*), there's a review of Dance eJay.

Cubase

With three releases on offer, Cubase caters for all levels of MIDI and audio sequencing. It's quick and easy to learn, and is established as the industry standard. For newcomers, **Cubasis Audio** provides eight tracks for audio, unlimited MIDI tracks and basic editing facilities. **Cubase VST** is a powerful all-in-one studio solution. There are 32 tracks for audio and a bundle of professional, real-time digital effects. Each audio channel provides a four-band parametric EQ and the whole system can be automated. **Cubase Score** provides all this, plus professional notation editing.

The main screen has an intuitive design.

Above Cakewalk Professional provides eight tracks for digital audio and as many MIDI tracks as you can throw at it
Right Cubase VST puts a mind-blowing professional studio right on your desktop. You'll need a fast PC to get the most from it, though

Tracks are displayed to the left and recorded parts are shown as blocks to the right. MIDI and audio are seamlessly integrated, and parts can be picked up and dragged to new tracks, copied and spliced with total freedom. You can learn the basics of Cubase in minutes, and get a tune up and running in no time. There are stacks of editors hiding behind the dropdown menus and more gadgets than we have space to mention. Without a doubt, the best sequencer around.

Mixman Studio enables you to remix the latest dance craze in the comfort of your own home

Cakewalk Express

If you're on a tight budget, take a look at Cakewalk Express. We don't find this package as easy to work with as Cubase, but it offers similar features and two tracks for audio.

There's a notation editor which enables you to print scores, and a virtual MIDI keyboard for entering notes with your mouse. There's also an upgrade path via **Home Studio** to **Cakewalk Professional**.

Home Studio has four audio tracks with a mix-down option, and better editing and notation editors. Professional extends functionality to include digital effects processing, eight audio tracks, pro score editor, a full complement of sync options and much more.

Mixman Studio

Mixman is included with several cards in this group test and is one of the most gratifying sequencing packages. You remix pre-recorded songs by "dropping in" musical clips that are pre-assigned to keys. You can set the drums in motion, fire up a bass line, trigger a vocal sample and add your own sounds over the top. Because the samples are always looping, it doesn't matter when you drop them in — they'll still be in time and fit musically.

Mixman is also a well-featured 16-track studio with some high-end gizmos like pitch-shifting and auto time-scaling. In the studio, you can plug in a mike or guitar and record your performances over the top. You can structure and record complete songs before outputting the file to a wave file for making a CD. There's a good choice of dance-orientated styles, including hip-hop, house and techno, and well-known bands have released albums in Mixman format.

PCW Details

Steinberg Cubase

Price Cubasis Audio £146.88 (£125 ex VAT; bundled with Terratec cards). Cubase VST £386.58 (£329 ex VAT). Cubase Score £586.33 (£499 ex VAT)

Contact Harman Audio 0181 207 5050
www.steinberg.net

Cakewalk

Price Cakewalk Express £57.58 (£49 ex VAT; bundled with AWE-64, Home Studio Pro and SW60 XG). Cakewalk Home Studio £116.33 (£99 ex VAT). Cakewalk Professional £233.83 (£199 ex VAT)

Contact Et Cetera Distribution 01706 228039
www.cakewalk.com

MixMan

Price MixMan Studio £46.94 (£39.95 ex VAT)

Contact Time + Space 01837 841100
www.timespace.com

p218 ➢

Audio and sample bank editing

Digital audio editing has come a long way since the release of Windows 95, which enables 32-bit native applications to perform real-time effects processing and allows them to work internally up to 24-bit resolution. These are features that were once exclusive to CD mastering studios, powered by high-end workstations. Now the technology is available for the PC.

But before we look further into the capabilities of current software, let's cover the basic principles and why you might want to use an editor in the first place.

On the crest of a sound wave

Every sound card comes with audio editing software. Some of you will be familiar with Wave Studio, which has been bundled with Creative Labs' cards since the early SoundBlaster days. It's best to think of an editor as a high-quality virtual tape player: when you load up a file, the "tape" is laid out in front of you, displaying its contents as a graphical waveform. Because we're dealing with digital audio, or a tapeless system, it is possible to jump to any point of a recording with the click of a mouse.

The most basic editing features you'll come across let you increase the gain (volume) of a file, remove unwanted sections and change the pitch. When working with audio-equipped sequencers you might record a vocal and decide to keep only a short section from the middle. As audio files take up large amounts of hard-disk space, you'll want to lose the unwanted sections or "crop" the inspired middle bit. Then you might like to hear how it sounds played backwards, perhaps with a touch of echo and with all the bass, or lower frequencies, removed.

Most users will find the editor with their sound card does almost everything they need, including the above example. But if you're interested in sound design, music production, audio for the internet and post-production, you'll need something more versatile.

WaveLab

WaveLab is a powerful two-track editing suite that covers every aspect of audio manipulation through to the CD mastering stage. Using multitasking and 32-bit processing you can apply effects in real-time while loading another file, say. It incorporates an audio database, supports batch processing and provides unlimited and instant undo functions.

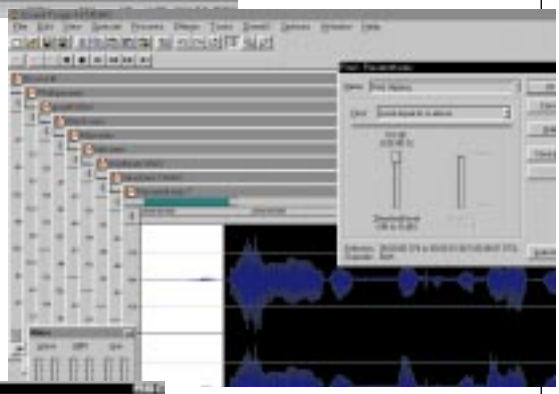
WaveLab ships with a range of mastering tools that include Steinberg's high-quality EQ-1 algorithms, a stereo expander and a range of effects. With support for DirectX and proprietary plug-in modules, you can update the processes as your needs change. There are already around 50 third-party plug-ins ranging from compressors and gates though to de-clicking modules capable of removing vinyl scratches, clicks and pops. When you have completed your master, you can burn a CD to Red-book standard, including full PQ coding of track markers.

Version 2.0 will be shipping by the time you read this and will integrate direct sampler support with looping functions, enabling processed recordings to be transferred via SCSI. Two new plug-ins will be included: Peakmaster, for adding a soft, real-time compression, and Puncher, for giving more attack to over-compressed rhythmic material.

Left Here's Wavelab utilising Opcode's DirectX Vocoder Plug-in and EQ-1 module

Below Soundforge can handle squillions of audio file types and has SCSI support for external samplers

Below, left Wien removes all the hard work associated with creating soundfonts, automatically looping and assigning samples to keygroups



SoundForge

SoundForge offers many features similar to WaveLab's, but is better suited to synchronising to video and general multimedia and internet use, supporting a vast range of sound formats. Although there is no CD support, one feature many will find useful is the ability to trigger audio regions via MIDI, treating it as a sampler. There's extensive support for external samplers and DigiDesign's SampleCell II. Patches can be transmitted and received via SCSI or MIDI and loops can be set up. A pop-up MIDI keyboard lets you preview samples at different pitches.

Basic tools include graphic and parametric EQs, waveform synthesis and tempo analysis. For large files, the auto-search for waveform glitches is handy. Native plug-ins include vinyl restoration, spectrum analysis and noise reduction. DirectX plug-ins are supported.

Sample bank managers

These enable you to create new instrument sets for downloading to your sound card's RAM. Part of editing sample banks includes the ability to tweak synth parameters, allowing you to control how samples are shaped and played back. Common parameters include pitch, panning, amplitude and filter settings. You can allocate samples to a range of keys, commonly known as keyboard "splits".

Going for gold

Wien is a new bank manager for Creative's SF2 format, supported by the AWE-32 and 64 and now Terratec's EWS cards. It is supplied as part of a Soundfont package called Wave It Gold. Wien does the hard work for you. Select a group of samples off disc, drop them beneath the keyboard, and Wien detects their pitches and assigns them to the appropriate keys. Samples are intelligently looped and keygroups set up. It really works, and can save you hours of editing time.

PCW Details

Sonic Foundry SoundForge

Price £349 (£297.02 ex VAT)

Contact SCV 0171 923 1892
www.sfoundry.com

Steinberg Wavelab

Price £329 (£280 ex VAT)

Contact Harman Audio 0181 207 5050
www.steinberg.com

Wave It Gold

Price £70.44 (£59.95 ex VAT)

Contact Harman Audio (*see above*)

Table of Features

Manufacturer	Aztech	Creative Labs	Diamond	Event Electronics	Gadget Labs	Guillemot
Sound Card	**PCI-128 Wave 3D**	**AWE-64 Gold**	**Monster Sound**	**Gina**	**Wave 4**	**Home Studio Pro 64**
Telephone Number	0181 400 9043	01734 344322	01189 444400	01245 344001	01706 228 039	0181 944 1940
URL	www.aztech.co.uk	www.cle.creaf.com	www.diamondmm.com	www.event1.com	www.gadgetlabs.com	www.guillemot.com
Price inc. VAT/ex. VAT	£59.95/£51	£129.25/£110	£129.25/£110	£499.38/£425	£269.08/£229	£249.10/£212
Bus Type	PCI	ISA	PCI	PCI	ISA	ISA
Minimum PC Specification	Pentium 166, 16Mb	Pentium 90, 8Mb	Pentium 90, 8Mb	Pentium, 16Mb RAM	486, 75+MHz	Pentium 90, 8Mb
FM Synthesis	●	●	❍	❍	❍	●
Sound Blaster Compatible	●	●	❍	❍	❍	●
WaveTable Synthesis	●	●	●	❍	❍	●
WaveTable Memory	2Mb ROM / 4Mb RAM	1Mb ROM / 4Mb RAM	2Mb ROM	❍	N/A	4Mb RAM
WaveTable DaughterBoard	❍	❍	●	N/A	●	●
Connector						
Max User RAM	N/A	Additional 8Mb	N/A	N/A	N/A	20Mb
Number of Voices	128	32 + 32 software	32	N/A	N/A	64
Digital Effects	●	●	●	❍	❍	●
3D Positional Audio	●	●	●	❍	❍	●
Claimed Signal to Noise Ratio	(Not stated)	90dB	80dB	98dB	93dB	> 91dB
Digital Input	❍	❍	❍	●	❍	●
Digital Output	❍	Synth only	❍	●	❍	●
Line Output	●	●	● (x2)	● (x8)	● (x2)	● (x2)
Line Input	●	●	●	Balanced input	● (x2)	●
Microphone Input	●	●	●	❍	❍	●
Sample Bank Manager	N/A	●	❍	N/A	N/A	●
MIDI Sequencer	MIDI Orchestrator Plus	MIDI Orchestrator Plus	None	Demo of Cubase	None	Cakewalk Express
Digital Audio Editor	Voyetra	Wave Studio	None	Cool Edit	GoldWave	Sound Impression
Games	❍	❍	Outlaws, Sim Copter Tiger Shark	❍	❍	❍
Additional Software	Windows Audio Utilities	Vienna, WebPhone	A3D Demo	SoundForge Demo	Performance Util	Quartz Audio Master 16 DTD

Table of Features

Manufacturer	Orchid	Terratec	Terratec	Turtle Beach	VideoLogic	Yamaha
Sound Card	**NuSound 3D**	**EWS64 XL**	**EWS64 S**	**Pinnacle**	**3D Sonic Storm**	**SW60 XG**
Telephone Number	01256 479898	01600 772111	01600 772111	01706 228 039	01923 260511	01908 366700
URL	www.orchid.com	www.terratec.co.uk	www.terratec.co.uk	www.tbeach.com	www.videologic.com	www.yamaha.co.uk
Price inc. VAT/ex. VAT	£49.35/£42	£399.50/340	£149.23/£127	£448.85/£382	£48.18/£ 41	£149.23/£127
Bus Type	PCI	ISA	ISA	ISA	PCI	ISA
Minimum PC Specification	Pentium 133, 16Mb	Pentium 90, 8Mb	Pentium 90, 8Mb	486DX2 8Mb	Pentium 75, 16Mb	486 25MHz
FM Synthesis	●	●	●	❍	●	❍
Sound Blaster Compatible	●	●	●	❍	●	❍
WaveTable Synthesis	●	●	●	●	●	●
WaveTable Memory	N/A	6Mb RAM	2Mb RAM	4Mb ROM	2Mb system RAM	4Mb ROM
WaveTable DaughterBoard	❍	●	●	●	❍	❍
Connector						
Max User RAM	N/A	64Mb	64Mb	48Mb	N/A	N/A
Number of Voices	64	64	64	32	●	32
Digital Effects	●	●	●	●	●	●
3D Positional Audio	●	●	●	❍	●	❍
Claimed Signal to Noise Ratio	(Not stated)	96dB	96dB	97dB	(Not stated)	(Not stated)
Digital Input	❍	● (x2)	Optional	Optional	❍	❍
Digital Output	❍	● (x2)	Optional	Optional	❍	❍
Line Output	Speaker only	● (x2)	● (x2)	●	●	●
Line Input	●	● (x2)	●	● (x2)	●	●
Microphone Input	●	●	●	●	●	●
Sample Bank Manager	N/A	●	●	●	❍	❍
MIDI Sequencer	MIDI Orchestrator	Cubasis	Cubasis	Digital Orchestrator SE	MidiSoft Studio	Cakewalk Xpress
Digital Audio Editor	Voyetra	Edison	Edison	AudioView	AudioRack	N/A
Games	Not supplied	Demo Worms 2	Demo Worms 2	❍	9 Demos	❍
Additional Software	A3D Demo	Mixman	Mixman	Audio Station 2	Trial of Dance eJay	Effects Utility

Key: ● Yes ❍ No

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Editor's Choice

There has never been so much choice when considering which sound card to buy. With prices ranging from as little as £42 to just short of £500, there's plenty to think about before parting with your cash.

If you're looking for a card to make music, you'll want as many options as you can afford. You may not yet require sampling capabilities, but when you're tired of General MIDI presets and lacking inspiration, sampling opens up a world of sounds to explore. You may at some point need digital I/O to record from DAT, CD or miniDisc, and as your needs grow, you will need more MIDI instruments.

Terratec's EWS64 XL is well equipped and meets the criteria, although it is slightly overpriced when you take a look at the EWS64 S, which comes in at just under £130. This cut-down version offers much the same in the way of processing and sampling capabilities, and with accelerated DirectSound and positional 3D audio, it's a great games card. There's also the aluminium flight case in which it comes. The software bundle will take some beating, with Cubasis AV for combined audio and MIDI sequencing, Mixman and stacks of worthwhile audio utilities. With a digital I/O option, WaveTable daughterboard connector and upgradable user RAM, the **Terratec EWS64 S** is clearly out in front and takes **Editor's Choice** for best all-round sound card.

Closely behind, the Guillemot Home Studio Pro provides a similar set of features and includes digital I/O as standard on a useful daughtercard. The Quartz Audio Master software offers intuitive audio and MIDI sequencing and there's plenty of on-board effects for all audio sources. Again, there's support for all major sound standards in both Windows and real-mode DOS, and accelerated DirectSound and positional 3D audio. You pay slightly more for the extra features but it's well worth a look, so the **Guillemot Home Studio Pro** receives our **Highly Commended** award.

If you need foolproof 16-bit SoundBlaster support and a basic studio setup, Creative Labs' AWE-64 is still going strong. Now at half its original price, the **AWE-64 Gold** offers a range of sampling and sequencing software and is also **Highly Commended**.

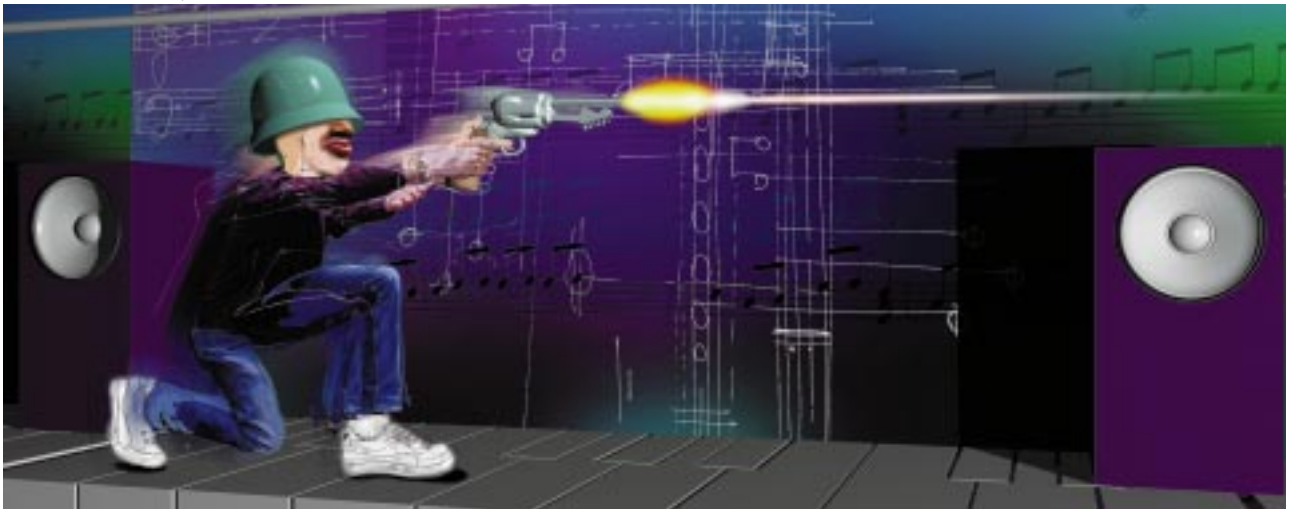
The first generation of PCI cards sound great in theory, but actually failed to impress. A3D positional audio is likely to become a standard, and although the industry will convert to PCI over the next year, it's going to take some time to get off the ground.

If you're intent on PCI with A3D support, choose the Orchid NuSound. The software is basic but it's cheap and has a high-quality output. The Aztech PCI-128 Wave is a great idea, combining both hardware and software synthesis, but kicks out more noise than is acceptable.

From top:
Terratec EWS64 S
Creative Labs AWE-64 Gold
Guillemot Home Studio Pro

If the Yamaha softsynth is appealing, find another card on which to run it.

● *PCI cards are imminent from Creative Labs and Turtle Beach, but were unable to meet our deadlines for this issue.*



Cyc-o-logical

Despite some failure in the past, researchers stil dream of cracking the Artificial Intelligence nut. Toby Howard reports on Cog and Cyc, the latest best hopes in AI.

Whatever happened to Artificial Intelligence (AI)? 2001 is looming, but where is HAL? After some misleading and premature claims for "thinking machines" in the seventies and eighties, AI got itself something of a bad name. But according to two researchers working at opposite ends of the field, true AI really might be just around the corner.

Computer scientist Douglas Lenat believes that before a computer can behave intelligently, it must have common sense. In his view, intelligence is simply a matter of being able to reason about the world and he is building a gigantic database of common-sense facts, called Cyc.

The trouble with common sense is that it isn't written down. To codify it, you have to write down facts and their inter-relationships and, to avoid ambiguities, do so in excruciating detail. Lenat reports that it took his team three months to write down enough so that Cyc could understand the sentence: "Napoleon died on St Helena; Wellington was saddened". Think of the web of knowledge you need to make sense of this: that Napoleon and Wellington are persons; that people die; that death is final; that people have emotions; that a person's death may cause emotions in others; that Wellington must have known of Napoleon's death… and so on.

The cogs are beginning to turn: AI takes another step forward with Cog, above

Cyc yourself up

The Cyc project is a mammoth undertaking. It began life in 1984 as a government/industry consortium funded to the tune of $25m over ten years. Now it's managed by Cycorp, a private concern in Texas <www.cyc.com>.

The US government believes in Cyc, and last year provided further funding of $1.5m. For the past 14 years, a team of programmers have laboriously created a gigantic "knowledge base" which currently contains about ten million facts, written in a special language called Cycl. This was phase one. The second phase, now in progress, is to provide facts to Cyc in plain English. Cyc now has enough common sense to correctly figure out a good proportion of the sentences fed to it.

Lenat expects Cyc to enter its third and final phase early in the next millennium. By then, Cyc will have enough common sense to automatically read and digest everything it can get its virtual hands on (dictionaries, encyclopaedias, novels) and it will scour the web for new material. Where it finds contradictions or ambiguities, it will ask a human "tutor" for assistance. But most of the time, Lenat says, Cyc will quietly consume human knowledge.

Cyc is a commercial venture, but last year Cycorp released a tiny part of its common-sense database on the web: 3,000 facts which they claim "capture the most general concepts of human consensus reality".

Cog, the intelligent android

While Cyc is undeniably a major achievement, some AI workers think Lenat is barking up the wrong tree. Intelligence is not, they say, an inevitable consequence of having enough common sense. Rather, it can only arise from interacting with the world and learning from direct experience. Scientists at the Massachussets Institute of Technology (MIT) are taking this approach to its logical conclusion: their goal is to build a robot with human intelligence.

Led by Rodney Brooks, the MIT team have created an android called Cog <www.ai.mit.edu/projects/cog/>. In some respects Cog is humanoid: it has a trunk, a head with video cameras for eyes, and an arm with a grasping hand. Ears, touch sensors, a fully-articulated hand and a voice are on the drawing board. But it can't move around: it's fixed to a heavy iron frame, linked by cables to a rack of dedicated processors which form its brain.

Whereas Cyc seeks intelligence with top-down programming, nobody programs Cog. The idea is that it learns through its experience, like a developing child. Critics have suggested that there's no need to build physical robots since they can be simulated in software. But Brooks defends his engineering approach, claiming that the form of the human body is intimately connected with its internal thought and that physical interaction with the world is crucial to the formation of true intelligence.

Media star

Cog is popular with the media, so much so that Brooks is now refusing all requests for interviews and visits to meet Cog "in person". Brooks and Lenat are worlds apart, and it is too early to tell where these different approaches will lead. Burnt by previous claims, this time around the AI community is being deeply and publicly sceptical. But everyone agrees on one thing: something interesting is happening in Artificial Intelligence. ■

A LEP of faith

Adam Evans reports on the LEP technology phenomenon. In only a few years' time, light emitting polymers could turn the display industry on its head.

Decades ago, the first science fiction movies showed a future filled with big displays hanging casually on the wall, and tiny portable wrist video phones that never needed recharging. We have gone some way to realising that future with Liquid Crystal Display (LCD) panels and gas plasma displays, but these devices are still expensive, heavy, fragile, inflexible and power hungry. And to cap it all, the quality of the images is not that good.

Considering these technologies represent the leading edge of today's display devices, it is a depressingly long list of complaints. Light Emitting Polymer (LEP) displays have the potential to address every single one of those complaints within a few short years.

LEPs were discovered in 1989 as a result of work headed by Richard Friend and Andrew Holmes at Cambridge University's Cavendish Laboratory. Cambridge Display Technology (CDT) <www.cdtltd.co.uk> was formed in 1992 and the role call of investors includes Cambridge University, Genesis (the rock group), Hermann Hauser (a founding director of Acorn) and Intel. Intel owns just two percent of CDT, but the computing giant's presence on the list shows the impact CDT has had in just a few years of research and development.

Let there be light

The first LEP produced a yellow-green light and was not terribly efficient, but with some chemical tweaking the research team brought the efficiency up to that of conventional Light Emitting Diodes (LEDs); it was then that they realised the potential of their discovery. The past six years have seen the development of different polymers which, working together, can emit any colour at greater brightness than the original. CDT has a number of licensees to its LEP technology, including Philips, Seiko-Epson and Uniax, an American firm producing lower-cost dot matrix LEP displays with the brightness of LEDs.

Basic displays are made by applying a thin film of LEP on to a glass or plastic backing which has been coated with a transparent indium tin oxide electrode. An aluminium electrode is then evaporated on top of the polymer. Applying an electric field between the two electrodes makes the polymer give off light. If the electrodes are patterned like a grid, light is given off at the junction of the electrode points.

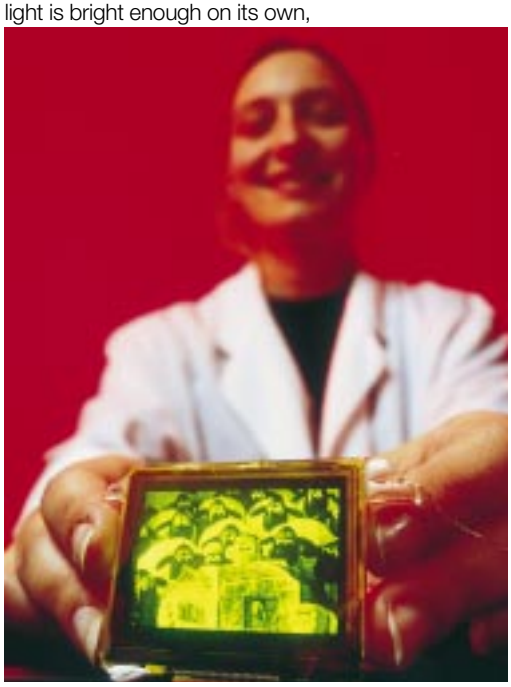
On 16th February 1998, using this technology, CDT and Seiko-Epson unveiled the first prototype LEP television screen. With a 50mm diagonal and measuring a mere 2mm thick, the black-and-white TV can show full TV pictures and, unlike LCD screens, has no restrictions on viewing angles or blurring of fast action shots.

The advantages of LEP displays over the current crop of screens are manifold. Unlike LCD and gas plasma devices, which require thin film processing on two glass plates, LEPs can be fabricated on one sheet of glass or plastic. This simplifies manufacturing processes and lowers costs, and allows displays to be produced in unusual (think "non-flat") flexible shapes. Philips predicts that LEPs will also be used as light sources: "Light-emitting polymers will evolve to become as flexible as fabric and as thin as paper. Formed or flat, applications will place … lighting on ceilings, walls, floors, or free-hanging." <wwweur.philips.com/design/vof/vofsite6/light/index.htm>.

Bright lights, no blurring

LEP displays are low-power devices and are self-emissive. This means the light is bright enough on its own, without the need for a number of components commonly found in LCDs, such as polarisers, colour filters and backlights. Added to this is the 180° viewing angle, the ability to show motion without blurring, and the robustness inherent in a display that is built on a single sheet of flexible plastic.

The applications for LEP displays are limitless. Initially used for intermittent backlights and seven-segment displays (like the one on your microwave cooker), computer monitors and TVs should be commercially available within five years.



Thin is in: Cambridge Display Technology has produced the world's thinnest TV display

Surprise package

All in all, it is an incredible story for a technology discovered only nine years ago. The sheer pace of development has taken the display industry by surprise, and many people are anxiously awaiting the first demonstration of an LEP colour TV. Seiko-Epson and CDT are on track to have a full-sized, full (16 million) colour display ready to show at a Tokyo show in October 1998. Expect to hear the prophets of CRT doom start wailing immediately afterwards. They will be premature, but in 20 years' time the world should be a better, flatter place. ■

Hands On Contents

■ Hands On is the place where readers can contribute to *PCW* and, as always, we'll pay for anything we use. Macros, sections of code and hints and tips will be rewarded with a £20 book or record token (please say which you would prefer) and we will pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format.
All submissions should be emailed to the author of the appropriate column or snailmailed to Hands On, Personal Computer World Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.
We are constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to pcw@vnu.co.uk.

Workshops

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Applications

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Miscellaneous

PCW/Hands On on CD-ROM
Tip, trick, advice or review. If you saw it here first, you can find it again: there's a year's worth of *Hands On* columns on our monthly CD-ROM. For problem-solving or that elusive handy hint, the *PCW* cover CD has the answer.

Star of the show

Panicos Georghiades explains Asymetrix 3D/FX, the 3D graphics and animation software given away on our *PCW* CD: here's how to get started and how to create your own scenes.

Asymetrix 3DF/X offers many features you will find only in more expensive 3D programs like AutoDesk 3D Studio. It lets you create still pictures and animations with all the characteristics of the 3D world: perspective, lighting effects, shadows and reflections.

Your working space in 3DF/X is called a scene and this is where all your 3D objects (including text) are placed. A scene can also have a backdrop which can be painted using a single colour, a gradient of colours, or another image.

One of the attractions of 3DF/X is its ease of use, partly due to its Catalogue feature. The program includes a library of raw materials which are arranged within the catalogue window. They include models (3D objects), surfaces, lights, backdrops and complete pre-defined scenes which you can alter and use as necessary.

Working with 3DF/X

The way you work with 3df/X is as follows:

1. Drag and drop a 3D object (model) from the Catalogue library into the Scene Preview window. Resize the model and position it as you wish. Then add a surface material by dragging one from the Surfaces Catalogue onto the model. Many models have multiple parts and you can add a different type of surface to each part, as in real life. There are many surface materials from which to choose; from granite, to gold.
2. Add lighting by selecting from the Lighting Catalogue, the number of lights, their colour and position. You can add more than one type to the same scene.
3. Add a backdrop by selecting from the Backdrops Catalogue.
4. Take a snapshot of the scene. This generates a 3D bitmap image by calculating its 3D characteristics according to the conditions you have set up. You can make this image as simple or as complex as you wish by selecting colour depth, quality of the rendering and whether you want the scene to include shadows and reflections.
5. If what you are after is an animation rather than a still image, you need to define a few more things such as the path of the animation of each object in your scene. You select animation paths from a catalogue for each object, or part of it, in your scene. You can modify the paths, add more than one to each object and so on. Then you create a moving video clip of the animated scene using the paths you have just set.

The program generates a series of snapshots of the scene which become the frames of your movie, each one generated according to the 3D settings you have set. Note that a movie can take a great deal of time (hours, in fact) if you opt for the best and most realistic quality. But these things do take a long time, even when using professional systems. Video files you generate in 3DF/X can include a soundtrack: a digital audio sound file (.WAV) that plays along with the animation.

Is 3DF/X an original sin?

One of the limitations of 3DF/X is that it has no facility for drawing original 3D models. You must use those available in the supplied catalogues, but there are over 200 which cover a variety of household and business objects as well as cars, aeroplanes and so on. However, the program does let you generate simple 3D models out of the shapes listed in Fig 1.

You can also import models created in AutoDesk 3D Studio (.3DS) or AutoCAD (.DXF) and you will find lots on the internet. It is possible to create models from Windows metafiles (.WMF format) and from bitmaps which have well-defined outlines, using the program's Line Trace facility.

In addition, you can create text models using any standard Windows TrueType font installed on your system, and you can edit these to change their thickness and other 3D characteristics such as their edges. You also have access to special, extended, ANSI characters using the standard Character Map Windows accessory — try the Wingdings.

There is a reasonable selection of surfaces which can be applied to models, together with highlights and reflections, and you can use any bitmap image as a surface. But that's not all: 3DF/X lets you use a Video for Windows (.AVI) file as a surface for a model and thus create changing surfaces (as seen on TV). You can have a video projected onto a moving face, or a cube spinning around.

Models can be warped in a number of ways: at the top, side and front using effects like twist, bow and angle. You can

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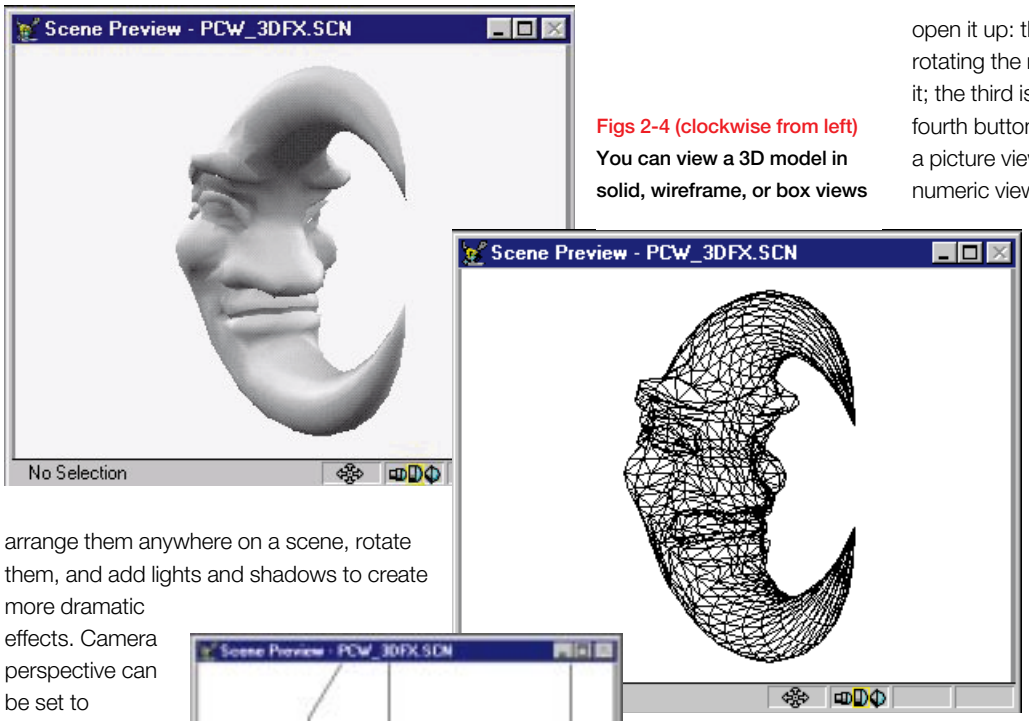
Fig 1 — Shapes available

Shape	3D model generated
Sphere	sphere
Ring	ring
Cylinder	cylinder
Cube	cube
Cone	cone, based on a cylinder
Plane	plane, based on a cube
Octahedron	octahedron, based on a sphere
Barrel	barrel, based on a sphere
Gear	gear, based on a cylinder
Hexnut	hexnut, based on a ring
Tube	tube, based on a cylinder
Double Bell	double bell, based on a sphere



Figs 2-4 (clockwise from left) You can view a 3D model in solid, wireframe, or box views

arrange them anywhere on a scene, rotate them, and add lights and shadows to create more dramatic effects. Camera perspective can be set to normal, wide angle or telephoto.

3DF/X has very good linking facilities. Using OLE, 3DF/X can generate material for use directly in other Windows applications.

Installation

During the installation procedure you will be asked for a serial number. Although this is not required for the program to work on your machine, you *will* need it if you wish to upgrade to Web 3D (see the upgrade offer in our *Cover Disc Notes* on p14). In addition, you will be asked whether you wish to install Video for Windows.

Important: if you are using Win95 or later DO NOT install Video for Windows, as an updated version is already on your machine. Choose No when asked if you wish Video for Windows to be installed.

Having installed the program, spend a few minutes finding your way around. Use the View menu, and open and close all its options to familiarise yourself with the various windows: in particular the scene contents, catalogue, position palette and animation palettes.

As you will see when you begin opening these, the screen can get crowded. If you have a good graphics card and a very fast machine, you will find it more comfortable to work if you set your card and monitor at a resolution of 1,024 x 768 (true colour). But if your machine is a Pentium 133MHz or less and your graphics card has less than 2Mb of VRAM, you will find that 800 x 600 is faster and provides enough working space.

Creating a simple scene

First, make sure the Scene Contents, Catalogue, Position Palette and Solid Models are all checked in the View menu.

Add a pre-set model

From the File menu, select Open and open the Basic 3DF/X Catalogue (3dfxbasc.cat). From the Catalogue window, select the Models tab and click and drag any model into the Scene Contents window. (Try the Man in the Moon model). At this point, from the View menu, select the three options in succession (boxes, wireframes, solid models) and see how the view of the model changes in the Scene window. (See Figs 2-4). Working with wireframes is faster when resizing and positioning models.

Moving, scaling, rotating

Next, learn how to scale, move and rotate the model using the Position palette. (See Figs 5-7). Click on the right button of the Position palette (a downward arrow) to open it up: the first button from the left is for rotating the model; the second is for moving it; the third is for scaling/re-sizing; and the fourth button from the left toggles between a picture view of the three options and a numeric view (the latter is faster). You can also use a combination of the mouse and the Shift key to control the three settings. Some experimentation here will be useful.

Adding a surface

A surface is a thin layer placed over the model's geometry. It can be a colour, a bitmap, or a material from the 3DF/X catalogues. You can also layer additional effects on a surface to change its appearance. Surface layers can include:

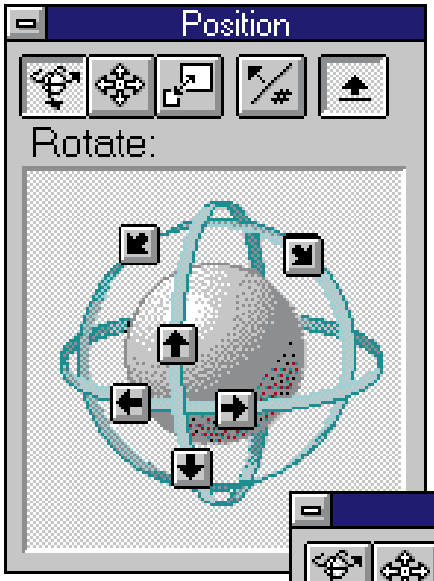
- A bump texture, which is a bitmap that defines a grey pattern and can be placed over a surface to make it appear textured.
- A reflection map defines a simulated reflection. It can be placed over a model's surface to make it appear to reflect the image in the map, rather than the scene.
- An environment map, which is a bitmap that defines a simulated reflection. When applied to an entire scene, all models with reflective surfaces in the scene appear to reflect the image in the environment map.

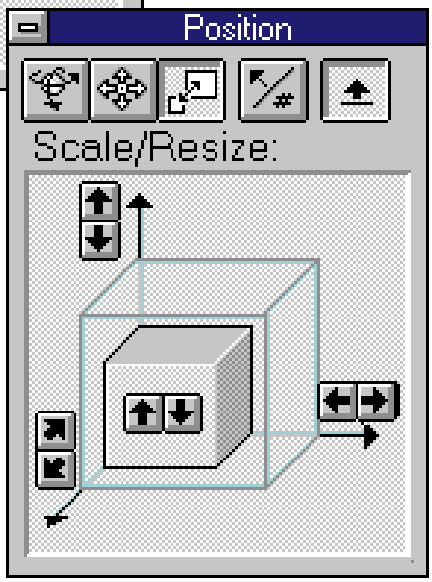
Press the Surfaces tab in the Catalogue window: from the available surfaces, drag and drop any one onto the model. Note that if you look at the status bar of the Catalogue window you will see a description of each surface you click on, and some have instructions on how to use it. Also note that with reflective surfaces you will not see the final colour/effect when you drag the surface onto the model. This will be visible only after you have created a snapshot.

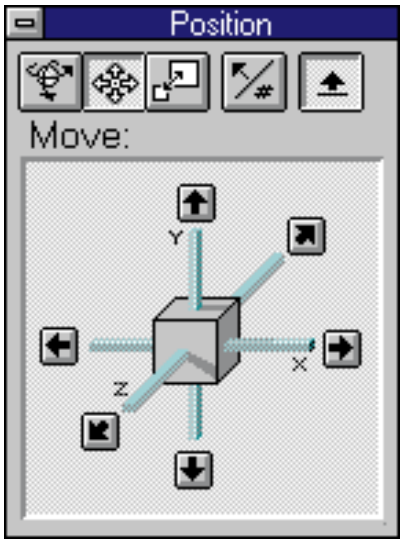
Having added a surface to the model, click the right mouse button on the model. This will reveal a pop-up window. Select Modify Surface & Color. This brings up a dialog box with options to modify the surface pattern, highlights and effects.

The lights are on...

Lights brighten models in a scene. You can add lights by dragging them from the Catalogue onto the model. Ambient light brightens every surface. Directional light (such as Default Left Light) effects are







Figs 5-7 (clockwise, from above) You can rotate, scale or move a 3D model using the controls in the Position palette

based on whether the model's surface faces towards or away from the light. Lights are always positioned outside the scene.

You can modify a light's direction, brightness or colour. To modify a light follow these steps:

1. From the Scene menu, choose Modify Lights.
2. Under Light Name(s), select a light to modify.
3. Under Settings, set the Intensity (brightness) and click the Color button to select a colour for the light.
4. If you have selected a directional light (not ambient), click in the Preview & Set Light Direction box to move the light to the position you want.
5. To briefly preview the effect of all lights added to the scene, click the Show All Lights button.
6. Click OK to close the dialog box and apply your changes.

Note that as 3D F/X generates a scene with shadows, the progress indicator tracks the calculation of shadows for each light in the scene.

At the backdrop of a hat

You can use a solid colour, a gradient, or a bitmap, metafile, or other graphic as a backdrop.

Models in a scene are always in front of a backdrop. Lights, shadows and fog do not affect it. To add one to a scene, simply click the Backdrops tab in the Catalogue, then drag out a backdrop and put it in the Scene Preview or Scene Contents window. You can show or hide a scene's backdrop by choosing Backdrop from the View menu.

Getting a snapshot

Creating a snapshot can take anything from less than a minute to many hours. From the Scene menu, select Generate Snapshot. It's a good idea to click on the Snapshot settings button and modify the settings so you can get a fast result, which gives you a rough idea of what your final image will look like before you decide to create one at the best quality.

Set smoothing to none, and set a small image size of 200 x 150 pixels. Set colour depth to 256 and quality to fair.

Creating an animation

You create animations in 3DF/X by applying animation paths to models. Animation paths are a set of instructions which tell a model how to move and whether the motion starts or ends outside the scene. One animation path of a model must finish before another can start. However, multiple models can be animated simultaneously.

Animations are saved in Video for Windows AVI file format. Here, you will have to select a Video for Windows compression format. If you are unfamiliar with this format, try Video 1 for experimentation and Indeo 3.2 or Cinepak for final results. The one you select can dramatically affect the quality of your results.

Creating a text model

All the effects we have described so far can be applied to text. 3DF/X enables you to create models from typed text using any TrueType font.

From the Models menu, select Create a Text Model. Then, in the dialog box, type your text, and click on the Modify 3D button. Alter all the settings in turn and, each time, click on the Update button to see the effect — it does not update automatically. Once you have created your text model you can add surfaces, lights and so on as before.

And there's more

In this brief workshop we have only scratched the surface of what 3DF/X can achieve. You may wish to experiment with some of the advanced options (which are listed in Fig 8) using 3DF/X Help. There's a lot to play around with and the only the limit is your own creativity. Have fun!

Fig 8 — Advanced options

Adding a wall or floor
Applying a digital video file as a surface
Creating a "glass" surface
Creating models which appear to be lights
Including only a model's shadow in a scene
Making a colour surface appear transparent
Making a model a sub-part of another model
Making a solid material surface transparent
Making a surface reflect a bitmap
Making a surface reflective
Making all models in a scene reflect a bitmap
Making a scene and backdrop appear smoky or snowy
Submerging a model in "water"
Warping a model

PCW Contact

Email Panicos Georghiades at win3.1@pcw.vnu.co.uk or write to him at the usual *PCW* address shown on p10.

The food **of love**

With a PC and a sound card, connect a MIDI keyboard and start making music. It's easy! Steven Helstrip shows you how to hook up, create tracks and sequence your music.

The thought of setting up a home studio can conjure up images of large, expensive boxes. It takes days to fathom out where to put these boxes, let alone to work out what they all do.

The mixing desk could always go in the living room, along with a few keyboards and effects units, while the drums could be set up in the kitchen — if there's room! You might also have to do something about the soundproofing, fit a lot more power supplies and get someone in to lay the cables. Sounds like a nightmare, doesn't it?

Perhaps you'd be more interested in a virtual studio? If you have a sound card in your PC, the chances are you already have much of what's needed to get started and there's no shortage of software to place a powerful studio at your fingertips. The mixing desk can sit discreetly in a window until it's needed.

Even basic sound cards have two synthesisers and effects with which to play. If your card has sampling capabilities, there's no limit to the range of sounds and instruments you can use. Best of all, most of the cabling is taken care of in software.

Whether you want to use your PC to compose and produce your own album, or would just like to dabble with the sounds available, here is where to achieve your aims. We'll talk you though the steps, from connecting a MIDI keyboard to your PC, through to sequencing your own tunes. If your PC has audio integrated on the motherboard rather than on a separate card, don't be put off — it will still function as a traditional sound card.

What we used

For this workshop we are running Cubase as our sequencer and have an AWE-64 Gold sound card fitted. Our examples can be applied to most sequencing packages, though, regardless of what sound card you have installed. If you fancy having a go with Cubase, you can find a demo on this month's cover-mounted CD-ROM, in the Audio section of the Software Library.

Sound advice

Getting sound in and out of a PC is easy. PCs with audio facilities, whether on the motherboard or a dedicated sound card, will feature several connectors for input and output. These are usually small 3.5mm stereo jacks (like Walkman headphone sockets) although more upmarket systems may feature two separate RCA jacks for left and right audio signals. You'll also find a wider D-type connector that doubles as an interface for joystick and MIDI connections.

Using a suitable cable, connect the audio line output of your PC to a pair of powered speakers or, better still, directly to your hi-fi. At the back of your hi-fi there will usually be a spare pair of line input sockets, often named "aux". Connect these to the line output of your sound card using the best-quality cable you can get your hands on. In fact, any of the inputs on your hi-fi should do, apart from the one for a turntable or record player. So if your CD, tuner, tape input or aux sockets are available, feel free to connect away. *Make sure the hi-fi is switched off at the time*.

If you plan to record audio from an external device, connect this to the PC's line input. Once connected, you'll be able to monitor what's being played through your hi-fi via the sound card's mixer, and play along at the same time. Some PCs feature digital audio inputs/outputs allowing you to connect digitally to a CD player, MiniDisc or DAT recorder without any degradation in sound quality.

MIDI matters

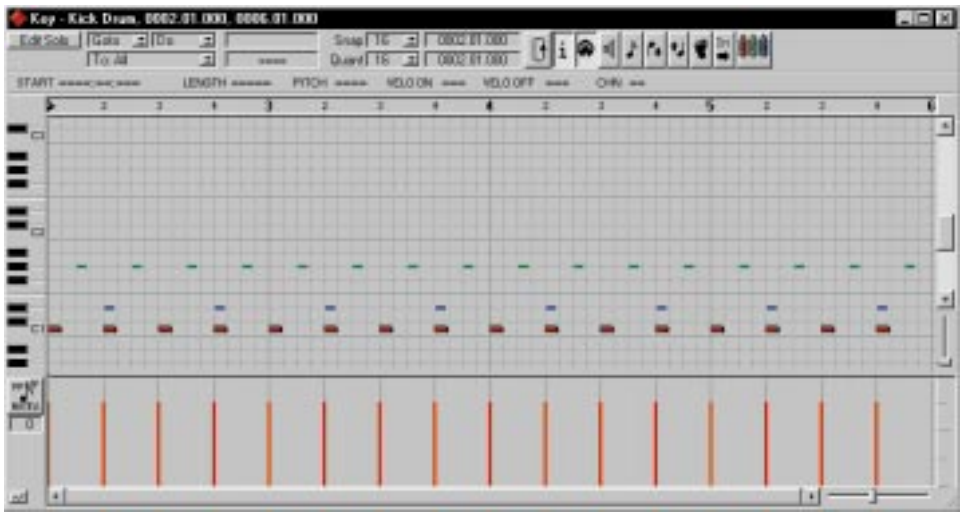
To connect a MIDI keyboard you'll need a MIDI adapter kit, which will set you back around £15 from most computer stores. This is usually a cable with a pair of standard, circular MIDI plugs at one end to connect to your musical instruments, and a single, wide D-Type plug at the other which connects to your PC's MIDI port. The two circular MIDI plugs are labelled MIDI IN and MIDI OUT.

Once the cable is plugged into your PC, connect the MIDI IN plug to the MIDI output socket of your musical keyboard. If your keyboard has sounds as well, connect the PC's MIDI OUT plug to the keyboard's MIDI IN socket.

It may be that the keyboard is just a MIDI controller and has no internal sounds at all. In this case, it won't have a MIDI input socket and the PC's MIDI OUT cable does not need to be used. If you have additional MIDI instruments such as a synthesiser module, either connect this to your keyboard's MIDI thru port, or the PC's MIDI OUT plug if it's not being used. You should now be able to control and play everything from your PC, and with any luck, you're ready to start sequencing.

On the right tracks

When a sequencer launches, you are presented with a list of empty tracks down the left-hand side of the screen. Over on the right is the arrange window, which is where recorded parts for each track will be displayed. Each track can be configured to play any MIDI instrument in your setup by assigning it to an audio output device and



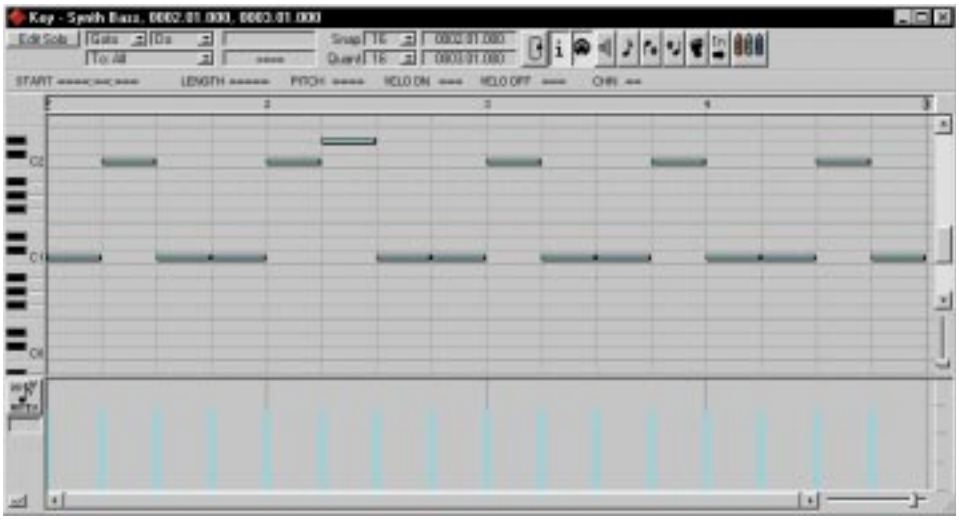


Fig 1 (above) Here is the foundation of our drum loop viewed in the piano roll editor
Fig 2 (right) This semiquaver synths the bass pattern, presented note by note, using step record

one of 16 MIDI channels. There are three audio output devices available to select from most PCs: either the main WaveTable synth, the FM synth, or an external MIDI device.

On the first track, select the WaveTable output and have a bash on your keyboard. If everything is working fine, you should be able to hear a piano, which is the first program in the General MIDI (GM) set. If nothing can be heard, it's probably because the synthesiser is turned down or muted in the sound card's mixer utility.

You can select different instruments by moving the Program Change parameter up and down, or by clicking on Patch which will bring up a list of instruments. Get a feel for the sounds that are available and try changing other track parameters such as volume and pan.

You'll find the drum patches on MIDI channel 10, which is also part of the GM specification. These differ slightly from instrument patches since each key has a different sound. The standard drum-kit sounds can be found at the lower end of the keyboard starting from C1, and they progress to percussion samples over a five-octave range. You can also choose between seven drum kits, again using program change (PC). However, these are mapped slightly differently and can be found on PC1, PC9, PC17, PC25, PC26, PC41 and PC49.

Sequencers operate in much the same way as a cassette deck, so you should already be familiar with the control buttons on the transport bar (play, rewind and stop). Before recording your first part, you need to set the tempo (speed) at which the sequencer will run. This can be found on, or near, the transport bar depending on which sequencer you're using.

And the beat goes on

It's a good idea to have the metronome enabled when recording, as this will give you a count-in and an indication of where the beat is. This is far more effective than trying to watch the song position pointer as it moves along the top of the screen. The metronome usually defaults to playing a "side stick" drum sample on MIDI channel 10, although this can be changed to any other instrument using the metronome settings dialog.

The only thing left to do is to set the measures (bars) where you want to record. Some sequencers record from the current song position with a two-bar lead-in, although in Cubase you'll need to set the Left and Right locators. This can be done in one of two ways: you can enter the bar numbers on the transport bar, or use the left and right mouse buttons to set the positions on the bar ruler just above the arrange window.

Recording a dance drum pattern

1. Select MIDI channel 10 and name the track "Kick Drum". The kick can be found on C1, which is usually the lowest key on a four or five-octave keyboard. Set the tempo to 120bpm (beats per minute) and the bar range from 2 to 6.
2. Following the two-bar lead-in, record the kick drum on the beat for the four bars and press stop. You will notice that a new pattern has been created between the locators. To hear it played back, rewind to the start and hit play. If you enable Cycle mode, the four bars will loop continuously.
3. Before we record a second track, let's first tidy up the kick pattern. Open the Piano Roll editor, which can be found in the Edit menu. Cubase users can simply double-click on the newly recorded part to do this. You can now see the pattern as it was played-in, showing all the notes that are, hopefully, not too far off the beat!
4. To rectify any timing anomalies, the Quantise function shifts notes to the nearest quantise value. This normally defaults to 16ths, or semi-quavers, although any value can be selected. After quantising the part, the kick will fall right on the beat. If any notes have shifted to the semi-quaver before or after the beat, simply drag them back with your mouse.
5. In the lower part of the screen, the

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velocity value for each note is displayed, showing how hard the keys were pressed. As we're dealing with a dance pattern, we'll make all these the same level. There's more than one way to do this. If you select the Pencil tool you can manually change the velocity for each note (useful when there are only a handful of notes to modify). The Line tool is better suited in this case, though, enabling you to literally draw a line across a selection of notes at the desired velocity.

6. Fix the velocities to 100 and return to the arrange window.

Laying down two more tracks

Although you can continue to record further drum patterns on the first track, it's better to place individual sounds on their own tracks. This provides greater flexibility further down the line when you might need to remove or copy just one instrument for, say, eight bars. You might also decide to change the output or instrument that's playing the kick pattern. If there are several other instruments on the same track, this will involve a lot more editing.

1. On the second track, record a hand clap on beats 2 and 4 for the four bars — don't forget to name the tracks as you go along, because you could soon have 30 or more tracks with which to deal. As with the kick drum, quantise the part and fix the velocities to 100.

2. On the third track, play in a simple hi-hat pattern. For instance, this could be an open hi-hat playing on the off-beat. With just three tracks in place, you now have the basis of a dance drum loop.

If you select all the parts in the arrange window and open the Piano roll editor, you should have something that resembles Fig 1. Each coloured pattern shows the contents of each track.

The piano is my forte

You can continue to add more percussion as you wish, but first let's get some other instruments playing.

1. On a new track, select Synth Bass 1 (PC39) on MIDI channel 1. For this part we're going to enter the notes in step-time, which enables you to program complex patterns note by note.

2. Set a one-bar range and create an empty part, either from the Structure menu or by double-clicking between the locator markers. In the piano roll editor, enable Step Record mode. Check your sequencer's help file if you're unsure how to do this. In Cubase you simply click on the foot icon.

3. There's a complex techno-like bass pattern for you to copy, shown in Fig 2. Ensure the quantise value is set to 16s (semi-quavers) and play in the pattern one note at a time. As you press each key you will see the notes appear on the piano roll grid.

4. When you have completed the one-bar pattern (16 notes), disable Step Record and have a listen. Try changing or deleting some of the notes and use the pencil tool to adjust note lengths in order to come up with an original pattern.

5. When you have something you like the sound of, return to the arrange window. Copy this pattern three times so you have a four-bar sequence to match the drums.

Creating another dimension

Let's now quickly record a basic chord progression to add some dimension to the existing parts.

On a new track, select MIDI channel 2 and choose a strings patch. As the bass line is based in the key of C minor, you could start with the very same chord for two bars, moving to G minor for bars three and four.

Quick guide to creating SoundFonts

To download a personal sound sample to your Creative Labs AWE-32 or 64 sound card, you first have to create a SoundFont using the Vienna utility. This will have been bundled with your card and can be found in the AWE folder in the Start menu. Right-click on the User Sample Pool folder and select Import Sample. Both mono and stereo samples can be loaded provided they are 44.1kHz 16-bit. Click on the Instrument Pool folder and choose Add Instrument. This prompts you to name the instrument and select the imported sample(s).

If you have imported a stereo file, you have to select both the left and right channels. Click Add and the instrument appears as a file within the Instrument Pool folder. You can audition the new instrument using the on-screen keyboard and assign the range of keys by dragging the handles beneath it. All AWE synth parameters can be tweaked at the bottom of the screen to shape the overall sound and apply effects. To loop an instrument, right-click on its sample and select Loop.

Once you have the loop points set up and the synth parameters set, right-click on the Melodic Pool folder and select New Melodic Preset. This lets you assign a Bank and Program Change number for your new instrument. Save your new SoundFont and open the AWE Control Panel.

In the User page, select a bank number where you want to load the SoundFont and click Browse to locate the file. Click Apply, and the instrument is loaded. To access the new instrument from a sequencer, open the list editor and insert a single Bank Select event (CC 0) on a new track in the setup bar. Enter the bank number in value 2 and insert a program change event. When these events are played, the track will be set up with your new instrument in place.

If everything has gone to plan you can audition new instruments from the Playback page

Tweak the parameters at the bottom of the page to come up with lots of interesting effects

The notes for C minor are C, E flat and G. G minor's notes consist of G, B flat and D. You could also sustain a low C throughout the progression to add more depth.

It's all arranged

With just the drums, bass and strings there is not yet much we can do to structure a song. But we can lay out the parts we have already, to get a feel for arranging.

1. You should now have seven parts set out on individual tracks. Copy these seven times to give you 32 bars in total.
2. Rather than start the song with all the instruments coming in at once, you could start with the strings on their own. Using the Erase tool, remove the parts on each of the remaining tracks for the first eight bars. From here you can bring in the bass, and after a further eight bars, the drums can come in too.
3. With a loose structure in place, choose a piano on a new track and see what ideas you can come up with.

It's good practice to record everything you play; you can always delete an idea, but you may not be able to replay an inspired phrase at a later stage. You can also record on as many tracks as you want, retaining just the ideas you like. They can easily be pieced together in any order using the Scissors and Glue tools.

CCs are not just a matter of power

So far, we have dealt with MIDI instruments, the piano roll editor and basic note information. But MIDI provides a further 128 controllers for changing synth parameters in real time, such as reverb and chorus settings. These are called Continuous Controllers (CCs).

A common use for CCs is to set the volume and pan position for each instrument at the beginning of a song, which is why we have left bar 1 empty. With these in place, along with program change messages on each channel, it is possible to play back the file from any MIDI player such as Windows Media Player, and on any GM-compatible device.

To insert individual CCs and program change events, it's best to use the list editor (Fig 3). In the insert dialog, select Continuous Controllers and use the pencil tool to add a CC just after the start of the bar. Two values have to be set for there to be any effect: value 1 selects the controller type (*see table, below*), and value 2 sets the parameter level from 0-127, where 0 equals off and 127 is maximum.

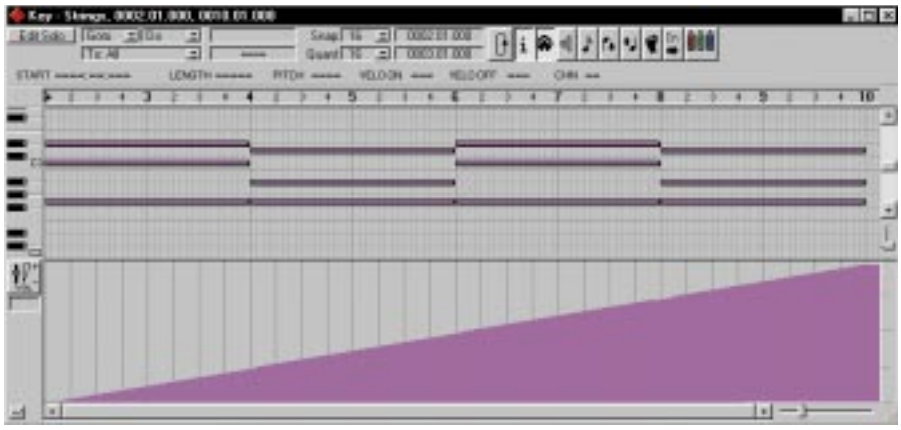

Fig 3 (left) Use the list edittor to insert track parameters in your setup bar
Fig 4 (below) To create a fade-in, or crescendo, use the line tool to draw a gradient while holding the Alt key

Not fade away, but fade in

More creative use of CCs enables you to fade-in instruments and pan them between the speakers. This involves inserting many CCs, which is easily done in the piano roll or controllers editor, depending on which sequencer you're using. Using our example, let's fade in the strings at the start of the song over the first eight bars. First, select the part and open the editor. To the left of where velocity values are displayed, click on the Event Type Selector and choose MainVolume. Then, while holding the Alt key, use the Line tool to draw a gradient from 0 at bar 2, to 127 at bar 10: the CCs will automatically be inserted (see Fig 4). You can apply the same technique using pan controllers for the techno bass riff. There's no reason why it shouldn't move continuously from left to right to create room for an additional bass sound that can sit in the centre.

Don't stop the music

Fig 5 shows the arrangement so far, but there's no reason why you should stop there. There are still 11 channels left for more instruments and as mentioned earlier you can integrate your own samples into the arrangement by downloading samples to your sound card. If you have an AWE-32 or 64 see the box opposite (p234) to see how it's done. And don't write off the FM synth; it may sound outdated, but it can be very effective in some instances.

Finally, don't forget to check out my *Hands On Sound* column each month for more sequencing and production tips.

Useful Continuous Controllers

0	Bank Select
1	Modulation Wheel
5	Portamento Time
7	Main Volume
10	Pan Position
11	Expression (secondary volume)
65	Portamento On/Off (0 = off 127= on)
71	Brightness (frequency cutoff)
74	Resonance
91	Reverb Level
93	Chorus Level

PCW Contacts

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Seven up

In part four of his series, Mark Whitehorn deals with the broad areas involved in upsizing, and considers the seven layers into which your database application can be split.

This is part four of my five-part series looking at how to move a database from a standalone Access application to an SQL Server database. Part one covered the basics of installing SQL Server and getting it up and running. Part two dealt with making an ODBC connection between a workstation and SQL Server. Part three discussed the different upsizing routes possible, given the different versions of Access and SQL Server that are available and then demonstrated how to use the upsize wizard to move a database from Access 97 through to SQL Server 6.5.

Wonderful wizards

The upsizing wizards, as I mentioned last month, are wonderful. They take a lot of the hard work out of upsizing an application. Essentially they do all the "grunt" work: the stuff that doesn't take too much thinking about, but often simply takes time.

A good example is the transfer of the data. Of course, you could look at all your Access tables personally, determine their structure including the field names and data types and work out what is the closest SQL Server data type for each field (see *Access and SQL Server mappings* box, *right*).

Then you could create the SQL Server tables (ensuring that the field names don't have spaces), transfer the data, and create the links between the Access forms and the respective tables. Well, you could and I could do it as well, but it is essentially mechanical work I can do without.

What the wizards can't do

However, there are certain areas of the translation from Access to SQL server that the wizard simply cannot handle. I would love to tell you that this is Microsoft's fault, that it didn't write the wizards well enough, but that simply wouldn't be true.

There are certain processes involved in upsizing which cannot be automated. This is because some of the decisions depend on an understanding of what the data "means". Until we get true machine intelligence (don't hold your breath) this will always leave lots of work for humans, or DBAs if no humans are available.

So let's look at these broader areas. We will begin by considering the seven layers into which a database application can be split. Upsizing actually causes these layers to become split between client and server. In turn, it is that separation which provides the problems (er, sorry… *challenges*) you may need to address.

The seven layers of wisdom

- Layer 1 — User interface

This is the part of the application which displays, for instance, the forms which interact with the user. These display information, prompts, provide data and help, allow the entry of information and control the activities undertaken.

- Layer 2 — Input validation

The checking of data as it is input to ensure that it is of the correct form and type (e.g. date format checking or numbers in numeric fields). In Access, this is often performed using the GUI rather than, say, VBA. The important point is that this checking is carried out on the form during data input as opposed to checking when the record is posted to the table.

In addition, this type of validation is often performed on the data in a single field ("Is the value in this field > 500?"); as opposed to validation which can be performed between fields (*see below*).

- Layer 3 — Application tasks

These are specific application functions such as calculating the tax or charges, summing entries and so on. An example in Access would be calculated fields in a query which are then used in a report. This is not the same as Input Validation, since the data being manipulated is already in the table. Instead, it is data manipulation performed by the application. Those manipulations do not permanently affect or alter the data in the database.

Access and SQL Server mappings

A useful table *(provided by Microsoft)* which shows the field type mappings between Access and SQL Server.

Microsoft Access	SQL Server
Yes/No	bit
Number (Byte)	smallint
Number (Integer)	smallint
Number (Long Integer)	int
Number (Single)	real
Number (Double)	float
Currency	money
Date/Time	datetime
AutoNumber	int
Text(n)	varchar(n)
Memo	text
OLE Object	image

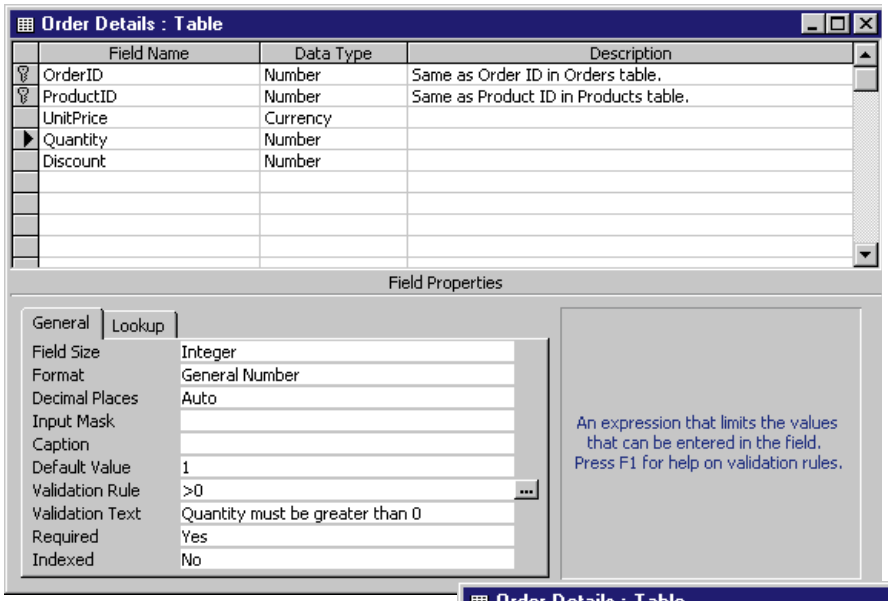

Fig 1 (above) In the original Access database there was a validation rule for the field [Order Details].Quantity

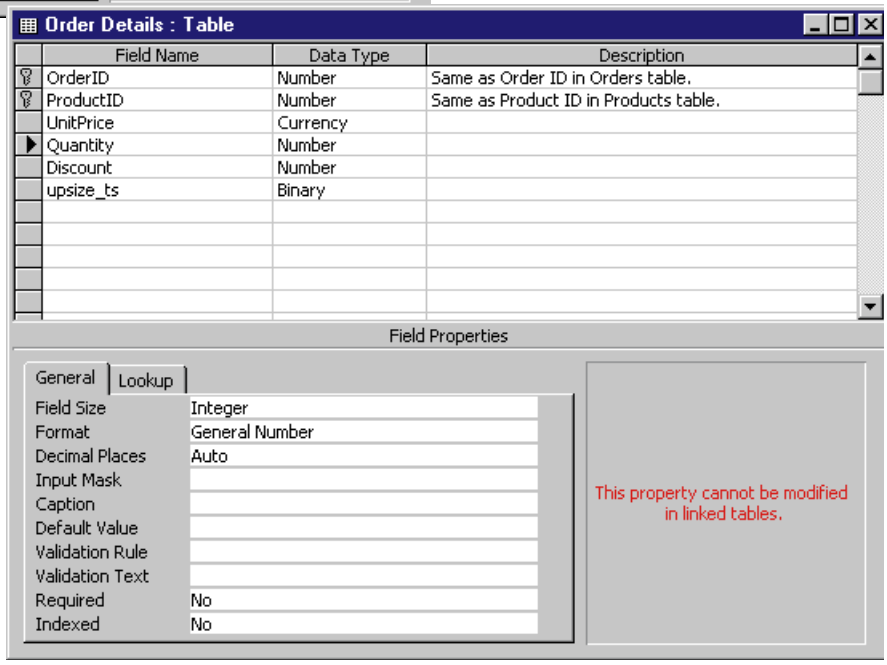

Fig 2 (right) After upsizing the validation rule for the field [Order Details].Quantity seems to have disappeared

• Layer 4 — Business rules

These check the specific business state and context. For example, a customer cannot order more than the amount defined by their credit limit. Note that this type of validation is often performed on the data in an entire record rather than on a specific field. For instance, a check such as "The value in field X must be greater than that in field Y" can only be performed after both figures have been input.

Typically, these checks are performed after the data has been entered into the form, just after the user tries to post the data to the database and before it is actually posted. Again, to put this into Access-speak, it is not unusual for such checks to be bound to the "Before Update" event of the form.

• Layer 5 — Data integrity rules

These are the rules which ensure all the information in the database is correct. If, at this point, you are thinking in terms of entity integrity, primary keys, unique indexes, referential integrity, foreign keys and that sort of business, you are in the right area.

• Layer 6 — Data management

This is the bit where the data is organised, queried and managed. In other words, this is the guy who actually manipulates the data. On the PC this is the jet engine which sits inside Access; on the server it will be SQL Server.

• Layer 7 — Data storage

Where the data is actually stored and accessed. In Access this is typically the hard disk of the PC but it may be the hard disk of a file server in a shared application. In a client-server system, the data is stored on the disks of the application server and is typically managed by a file system such as the Windows NTFS.

Given a single-user Access database application running on one PC, all seven layers clearly reside on one machine. However, when you upsize to a client-server system some, but crucially not all, of these move onto the server.

Some are born to serve

OK, let's start with the easy ones. The user interface (layer 1) stays on the PC, the data storage (layer 7) and data management (layer 6) move to the server.

It ought to be reasonably obvious that the data integrity rules (layer 5) have to follow the data onto the server and the wizard takes care of most of these moves. So far, so good.

The ultimate positioning of the remaining layers is less clear, which is another way of saying that parts can be placed on either the client or the server and that this is where your skill and judgement come into play.

1. Layer 2 — Input validation. SQL Server allows for the control of data input into individual fields. In other words, this form of checking can be passed to the server.

For example, in the sample Access database (called UPSIZE.MDB) supplied on our *PCW* CD-ROM last month (and again this month), there is a table called Order Details. Within that table is a field called Quantity which has been given a validation rule of >0 (Fig 1). At first sight, this validation seems to have been removed during the upsizing process since it doesn't appear in the attached tables after upsizing (Fig 2). The rule is still being applied, though: the upsizing wizard has simply implemented it as a trigger in SQL Server (Fig 3). So this bit of input validation has moved to the server.

This is good because it means that the input is being controlled centrally. No matter

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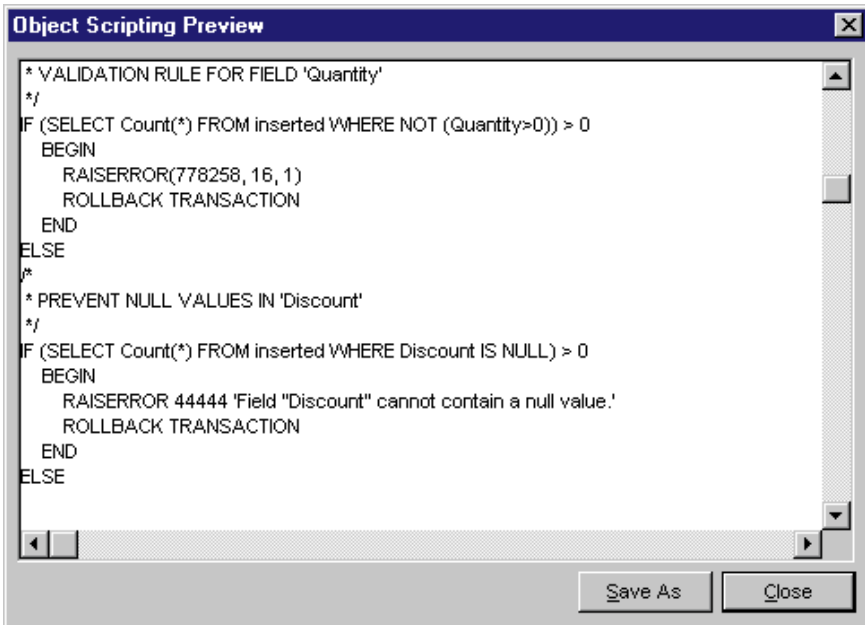
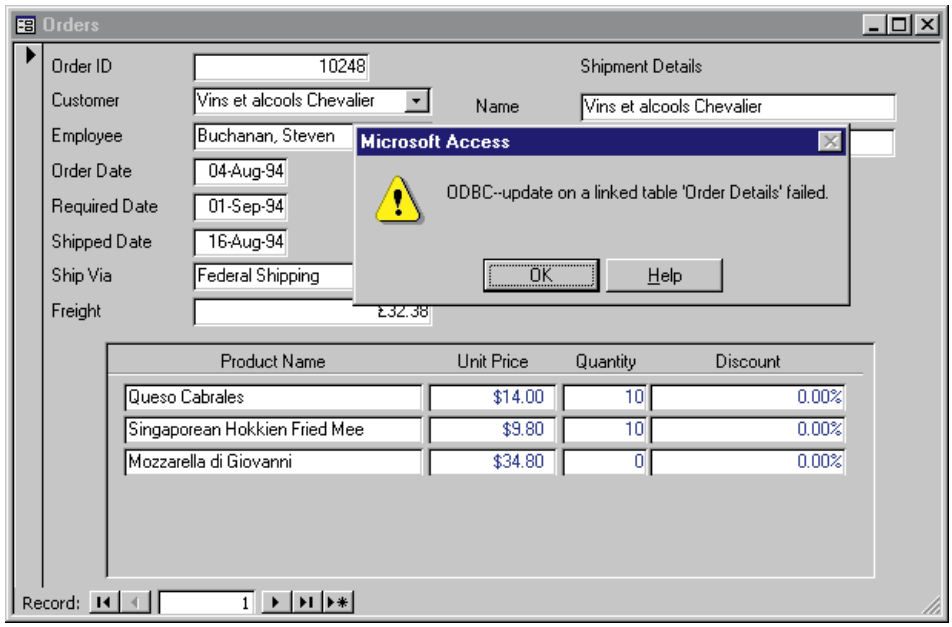
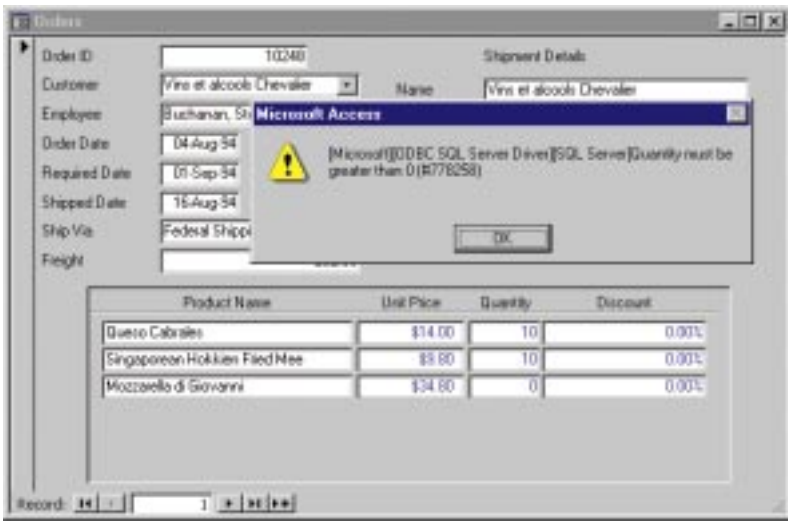


Fig 3 (above) The validation rule is now handled as a trigger in SQL Server…



Figs 4 & 5 (right & below right)…which is good for overall control but bad for the elegance with which the error is handled



how anyone tries to enter data into your precious database, it will be protected from invalid data. That's the good news. The bad news is that the error is now handled very inelegantly (Figs 4 & 5).

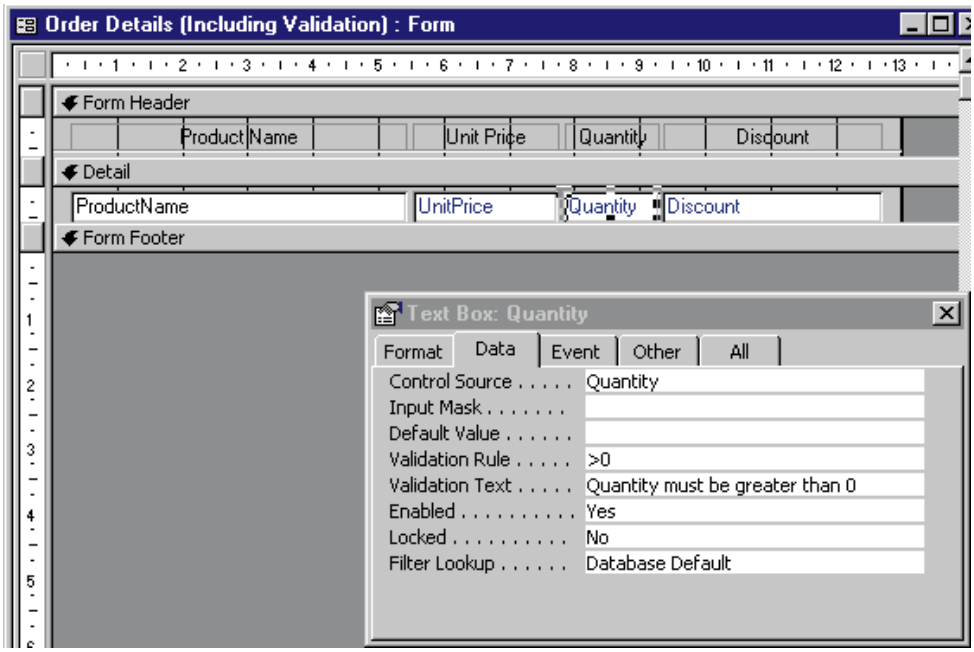
One solution, which is demonstrated in UPSIZING.MDB, is to add additional input validation to the form (Fig 6). This results in much cleaner error handling (Fig 7) but it leaves us with a problem trying to decide exactly which is now performing the input validation; the client or the server? In fact, this is a slightly more difficult question than it first seems because of the different way in which these types of validation work.

The form's new input validation works as soon as the user moves the focus out of the text box, whereas the trigger (on the server) is only activated once an attempt is made to post the record. So it could be argued that, according to the definitions given above, the trigger is performing a function more like a business rule than input validation. My interpretation of all this is that input validation is still the prerogative of the client, since placing the validation there ensures more timely and more elegant error trapping. But the upsizing wizard can't do this so it does the next best thing and moves the input validation to the server. The take-home message is that you are well advised to spend some time supplementing that validation and some on the client.

2. **Layer 3 — Application tasks.** You will be delighted to know that this is another grey area! An RDBMS like SQL Server effectively has no truck with anything as common as reporting. It is concerned with storing and manipulating the data, so reporting will remain the province of the client.

However, you might well use a "view" on the server to perform the data manipulation. In general, at the risk of sticking my neck out, I would say that most of the application tasks remain on the client but you may well want to move parts to the server.

3. **Layer 4 — Business rules.** Ah, suddenly we have emerged from the gloom. The business rules are generally all implemented on the server, which makes reasonable sense when you consider that they are often only applied to the data once the user tries to send it to the server. Holding the business rules centrally makes them easier to maintain and guarantees that



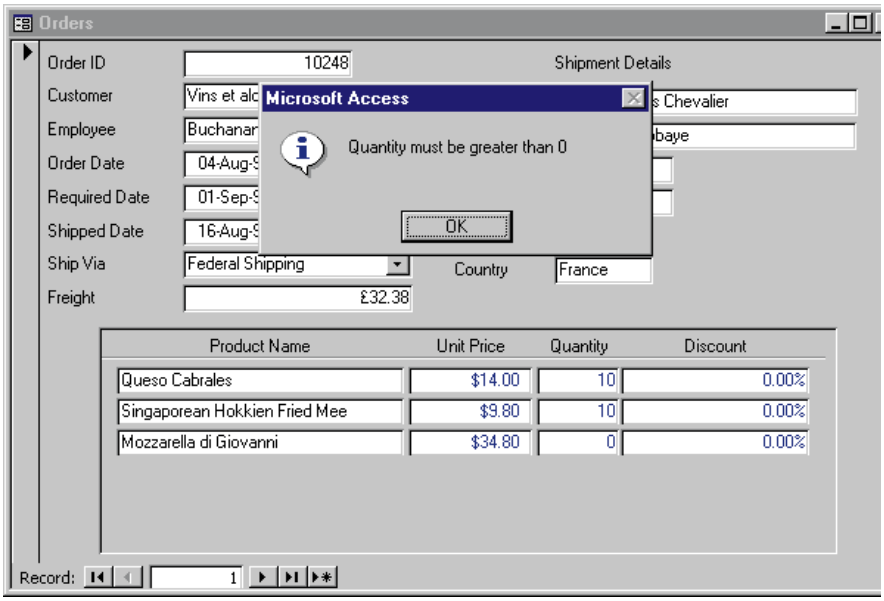


Fig 6 (above) Adding extra input validation to the form…
Fig 7 (right) …which gives much cleaner error handling

they are applied globally. The sorts of tools used to implement them in SQL Server are triggers, stored procedures, column-level constraints and table-level constraints.

So, we have finally got to the stage where we can summarise where these layers generally end up (with the provisos outlined above):

Client	
Layer 1	User interface
Layer 2	Input validation
Layer 3	Application Tasks
Server	
Layer 4	Business Rules
Layer 5	Data Integrity Rules
Layer 6	Data Management
Layer 7	Data Storage

The challenges are provided by Layers 2 and 3, and those are the ones wherein lie the most scope for tweaking by hand.

The reality

This may all have seemed a little dry, not to say abstract, so let's look at an example. You have an Access application which has some typical forms within it. One of these enables your users to enter information about new customers. It has a combo box that shows a list of cities and the users have to pick one city for each customer.

Let's assume that this combo box draws its data from a table called (unimaginatively) CITIES. Clearly, this combo box is providing a type of input validation, so of course it needs to reside on the client. *Ah! But… er… where does the table called CITIES reside?* Well, on the server of course. That's where the upsizing wizard will have put it (unless you told it otherwise) and that seems right. After all, the table contains data and the server is where data is stored.

But suppose that the list of cities is fixed in stone. No new cities have been added in living memory. *So what? Who cares if the table doesn't change?* Well, suppose it is a big table. Every time one of your users pops down that combo box, the application on the client has to ask the server for the data and that data has to be shipped across the network.

Surely there is a case for storing this data locally on each client? I would certainly have thought so, but this is what many people would term a judgement call.

To return to my original thesis, judgement calls are precisely what we can't expect the upsizing wizard to make. It will simply place the CITIES table on the server because it has no concept of how the data is used nor how frequently it is updated.

Food for thought

To leave you with a brainteaser, what happens if the CITIES table *is* sometimes updated? Suppose it is updated once a year, or perhaps once a quarter, or once a month… once a week… once a day?

At what point do you decide to store the CITIES table on the server, or is there a third strategy you can employ? If so, what are the elements that you have to balance in deciding which strategy you are going use?

Next month, I'll provide the answer to (or at least some discussion of) that question; and we'll focus on more specific issues where human fine-tuning is often required.

■ *Thanks to Keith Burns, of Microsoft, for providing the UPSIZE.MDB.*

PCW Contact

Email Mark Whitehorn at database@pcw.vnu.co.uk or write to him at the usual *PCW* address (p10)
■ Mark Whitehorn's book, *Inside Relational Databases*, is available through our Reader Offers section, see p318 for details.

The problem with **Explorer**

Microsoft seems determined, by hook or by crook, to get Internet Explorer onto your system as your default browser. Nigel Whitfield comments, while putting other net niggles to rights.

The internet is very rapidly becoming an important part of the distribution mechanism for software, with more and more companies allowing the public to download trial software, or updates. The cynical might suggest that rather than being a means of ensuring wide beta testing and ironing out of bugs, the free betas are more likely a way to make sure your data is locked up in a new product before you have time to consider the competition.

Of course, another way of distributing software is by bundling it with other programs, and it's just that sort of practice that's causing Microsoft a certain amount of hassle, due to its attempts at bundling Internet Explorer with Windows. The excuse that it's so tightly integrated into the operating system it can't be removed, doesn't exactly work with Windows 95, since it can actually be uninstalled in a trice.

Windows 98 may be a different matter, but that's only because it's been designed that way — and I'll leave aside the curious wisdom of a company that's been trumpeting its usability research for years, only to tell us now that it's better to launch everything with a single click than a double one, via the dubious usefulness of "desktop integration".

Whether or not Microsoft will finally have to succumb and remove its browser from the operating system is still a little uncertain. But it may well have alternative plans anyway, notwithstanding the current fines being levied.

Download dramas

Have you attempted to download Microsoft internet programs from the web site? How about Outlook 98? Or maybe you've been looking at IIS 4.0 for your NT box. In both these cases you'll have found something rather disturbing: the requirement, in order to run either the web server or, for heaven's sake, a contact manager and email program, is that you have Internet Explorer 4 cluttering up your system.

If there are components, like DLLs, they can be unbundled and supplied with Outlook. If Outlook actually calls upon something other than DLLs, it's badly written. More likely, however, is that Microsoft is simply finding other ways to foist its browser on us. And in the case of Outlook 98, that meant spending time on a

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32Mb download (silly me, I only had the Demon edition of IE4, and that wasn't good enough) and freeing up 120Mb of disk space to run the installer — complete with Java virtual machine, Explorer fonts and Outlook Express.

I have a permanent net link so I can just sit back and wait. But Joe Punter cannot, and even if the software is delivered on CD, do we really need this insidious infiltration of our systems by a browser that we don't even want? There's no option about it — install Outlook 98, and Explorer appears on your system.

To me, that's almost worse than having a browser coming with the OS; at least you only have to junk it once, rather than having it re-installed each time you want to try out the latest Microsoft internet application.

Perhaps this is just an aberration. Maybe Microsoft won't try this sort of expensive (it's not cheap when it makes your download 32Mb) trick on other pieces of net-aware software that it makes available on the web. But isn't it funny how when Microsoft is having problems with one way of delivering a copy of Internet Explorer, another one comes along?

Questions & Answers

Q Many of the sites I've visited have buttons that change when the mouse moves over them. How can I create this effect on my web pages?

A The effect is called a JavaScript rollover and, as the name suggests, it's done using JavaScript. I'll cover it in more detail in a future column, but for now, there's a simple solution that you may care to use. The Web Review site has a rollover generator that allows you to fill in details of the images that you want to use, and will automatically create code that you can cut and paste into your own web page to create the desired effect. You can find out more at style.webreview.com/wr/pub/98/03/13/coder/rollover.html.

You can create a JavaScript rollover by filling in a web form then copying and pasting.

Q I use dial-up networking in Windows 95. I would find the Automatic Connection feature of IE4 (I assume this means you don't receive a window requesting a password) very useful, but it doesn't work. If I go to Internet Options, choose the Connection tab, then choose Connection settings and put in my password, then click OK, it promptly ignores it! Returning to Settings as soon as I have pressed OK reveals nothing in the Password box — no asterisks, nothing. Why?

A It's most likely that you have signed on to Windows without a password. Dial-up networking will not allow you to save the password unless you have signed on as a user with a valid password. If you clicked the Cancel button when Windows asked you for a name and password, then you'll have this problem.

There are two solutions. The first is to sign in to Windows as a user with a password each time you want to use your system — and if you share the computer with other people, you can then have a separate desktop for each user.

The alternative is to sign on with no password. If you've always been in the habit of simply pressing Cancel

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when Windows asks you for a name and password, and haven't created any users yet, then all you need to do is create a user by typing your first name, with no password. When you're asked to confirm the password, enter a blank one again, and press Enter. You won't be asked in future to sign on when you start Windows, and Dial-Up Networking should allow you to save the password.

Q My niece has asked me to print some of the images from the Titanic Movie web site. I saved the page so as to open it later in Corel Print House where I can choose only the image from the page, but the page saved as (.htm) extension without graphics. How can I save the page as an image?

A When you tell your web browser to save a page, it saves just that — the page itself. And an HTML page is simply a description of what's on the page, with references to other items held on the web server. In other words, the HTML file that you've saved doesn't actually include the pictures. It simply says: "This picture goes here on the page."

If you want to recreate the page on your hard disk, you'll need to save each image individually. How you do that depends on which browser you're using. You may have to click on the image with the right mouse button and choose Save, or hold down the mouse button on the Mac.

To recreate the page, you'll need to look at the HTML source and see where the pictures were originally stored in relation to the page itself. For instance, if all the images appear when you choose View Source with a reference like ../graphics/picture.GIF, and you've saved the file as c\html\titanic\page1.htm, then you'll need to create a directory called c\html\graphics and save all the pictures in there.

Q The cache directory in my Microsoft Explorer is gradually expanding. Will there be any adverse effects if I delete the files in the cache directory? What is it for, anyway?

A The cache directory is used to help speed up access to the web. You'll typically find that many of the things in it are graphics files, though there may be some web pages too. When something that Explorer needs to display a page is in the cache, it can be used without having to fetch it from the web site. This speeds up access, especially if you have a slow link.

You can empty the cache via preferences in Explorer, if you want to free up some disk space

For example, a web site might have a corporate logo and a button bar at the bottom of each page. By cacheing these items, they only need to be fetched once, even though they might be displayed dozens of times during your visit to the site.

You can clear the cache out simply by deleting it, but the best way is through the options in Explorer. This will also let you say how long things are kept in the cache, and how often it should check to see whether there's a more up-to-date version of the item it needs.

Q I'm looking for some old college pals, but the email directories I have gained access to through Yahoo, BigFoot etc seem to be centred on the USA. Could you please give me the location of the UK ones, assuming there are any?

A There aren't any large UK email directories that I know of. Your best bet is to check with the main directory services such as Four11 and BigFoot for people in the UK.

It's also worth checking with college alumni associations, some of which may collect email addresses for their directories. Of course, many of these will only produce addresses for people who have asked to be included.

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Questions & Answers

HotBot has a special option to use when you're searching for names on the internet

(*continued from page 247*)

You may be able to track some people down, regardless of whether or not they're signed up for directories, by using the Usenet name search system to see if they've ever posted to a newsgroup. To do that, send a message to mail-server@rtfm.mit.edu with no subject and a line in the message body that says, for example:

```
send usenet-addresses/whitfield
```

and you'll receive a list giving you addresses and dates when that address last posted to a newsgroup. Remember that you need to use a whole name: you can't just enter a part of it.

Another possibility is the simple brute-force method of typing a name into a web search engine and seeing what you come up with. One of the best ones to use for that kind of search is HotBot www.hotbot.com which can be told that what you're looking for is a name, so if you ask for Nigel Whitfield, HotBot will look for "Whitfield, Nigel".

Q I have a P120 running Windows 95. When running a check using First Aid, it throws up an error in IE 3 — "File C\WINDOWS\SYSTEM\JGDWMIE.DLL is missing". I've tried to download this file from the web, but there are no hits. I've been using IE 3 with no apparent problems, so can I safely ignore this apparent error?

A Yes, you can. The file can be replaced, if you wish, from win95_09.cab of Windows 95, OSR2, but it's not essential for Explorer. It appears to be a DLL for viewing a type of file called "JG," from America Online, and presumably won't be called upon unless you try to view that type of content. If you don't have the OSR2 release of Windows 95, then you could try re-installing Explorer.

Q When I was configuring Netscape Communicator to fetch my mail, I noticed an option for accessing messages via IMAP instead of POP. What's the difference, and why would I want to use IMAP instead?

A IMAP (the latest version is IMAP4) is a much more modern protocol than POP3, though both are, at their simplest, ways of retrieving information from a remote mailbox, like the way you collect your messages from an internet provider.

However, IMAP (Internet Message Access Protocol) provides many more features, including remote folders. In other words, you can organise your messages into folders, and still store them on the mail server. For many people that may not be an issue, since you'll only have one computer from which you want to access your mail. But for those who move around, it can be very useful indeed, since messages that have been filed on the server will be accessible from anywhere, as long as you have access to an IMAP mail program. IMAP also allows for shared folders, making it ideal for group working.

There are a number of IMAP servers available, both commercial and free, for different platforms. If you have a network in the office and want people to be able to access their mail from outside, it may be worth installing an IMAP server. At present, it's not a service that internet providers tend to offer — at least not for their standard domestic customers — so the majority of readers won't need to worry about it.

You can find out more by checking the web pages at www.imap.org.

PCW Contact

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The day the music **died**

Tim Nott likes music while he works but after installing a scanner, he discovered his CD audio disks wouldn't produce a squeak; here's how to prevent the same happening to you.

Music is important to me. So much so that when I first got a CD-ROM drive in 1992 I was so *unimpressed* with the crappy speakers on offer that I went out and bought a second-hand Sony tuner/amplifier and a pair of Mordaunt-Short bookshelf speakers.

A few months ago, I decided that fitting a second CD-ROM drive would be a good idea. All was fine and dandy until I installed a scanner. This entailed fitting a card into an ISA slot on the PC, which is, in effect, an extra parallel port and then installing the TWAIN drivers. (Just to go off at a slight tangent, I am told that this acronym stands for Technology Without An Interesting Name — does anyone know if this is true?). Anyway, all went fine and soon I was scanning away like billy-oh. Except that the next time I stuck a CD audio disk into the drive, no music was forthcoming.

OK, I know about all this stuff, don't I? The volume control wasn't turned down or muted. The CD audio tab in Control Panel/Multimedia was pointing at the right drive. The CD player applet was churning away, so it wasn't an autoplay problem.

WAV and MIDI files were playing loud and clear so I settled down for a good session of ferreting in System/Device Manager for possible conflicts. And then a little bell began to chime. It certainly was something to do with the scanner installation but the scanner hardware and drivers were innocent and walked from the court. A quick exhumation order on the PC casing revealed the true culprit. It was foolish, clumsy Nott, who had dislodged the little cable connecting the CD-ROM audio output to the sound card!

Fig 1 Snagit can capture text where the clipboard dares not go

Of fonts and files

Richard Baddiley wanted to create a list of TrueType font names alongside their DOS filenames. A perfectly reasonable request, I thought, but of course the Font folder won't print a list. Furthermore, the DOS DIR command won't display the font names — only the file names. The only solution I could think of was to OCR screenshots of the Fonts folder. Some might call this stupid — I call it lateral thinking. Some are right, however, as the resolution was far too low.

I was just about to put this out to tender when a tiny bell tinkled somewhere over the other side of the Chinese wall that divides Tim Nott (operating systems) from Tim Nott (application reviews). Yes, Snagit (Fig 1), which I looked at in the *View From The Desktop column* last October, does this very thing. It's a screen grabber that has two killer features in this context: it will grab a window's contents as text and it will grab the entire, vertical, scrollable contents in one swoop. Note that with "vertical" (with the column and window width suitably adjusted) you can optionally exclude the file size and date stamps.

Fonts go AWOL

While we are in the vicinity, here's a common problem: the Fonts folder losing its magical properties.

The latest report comes from Hitesh Jethwa. His "Install new font" command had gone AWOL from the File menu. The easy way to fix this is with TweakUI (part of Microsoft Powertoys) where there's an

Shutdown blues update

An update on shutdown blues, from Alan Wooley, who went through the procedures outlined in my February and March columns: *"To add insult to injury, the problem was intermittent. Finally the finger pointed at FlexiCD which will not shut down with a CD left in the drive…"* And from Colin Spencer: *"If you have an IDE drive, ensure that the master/slave jumpers are correctly set. If they are not, then the machine just displays the 'wait' screen and never displays the 'safe to turn off' screen. I found this by trial and error on my son's machine."*

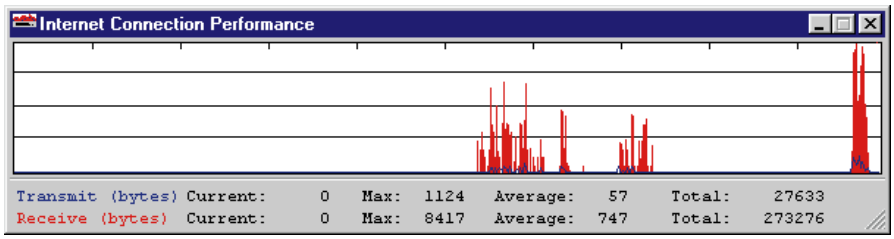

Fig 2 **No beauty, but full of vital statistics**

option to repair the fonts folder. If this doesn't work, or you don't have TweakUI, or would like to know why the problem occurs, there are three possibilities.

Listing 1 — check out the desktop.ini

```
CD C:\Windows\Fonts
REN desktop.ini desktop.old
CD C:\Windows
extract /A <source> desktop.ini /L C:\Windows\Fonts
```

Starting with the simplest, it could be that the Fonts folder has lost its system attribute. To check this, right-click on the Fonts folder in Explorer, choose Properties and look in the Attributes panel: if System isn't checked, this is the problem. However, it will be greyed so you can't change it here. Instead, open a DOS window and, if not already in C:\Windows, type:

```
CD C:\Windows
ATTRIB +S C:\Windows\Fonts
```

If you're the kind of rugged individualist who doesn't keep Windows in C:\Windows or the fonts in C:\Windows\Fonts, alter the above lines to suit.

Restart the PC. If this doesn't do the trick then it's possible that the DESKTOP.INI file in the Fonts folder is damaged or missing. First, put the Windows installation CD (or second floppy) in the drive, open a DOS window and check out Listing 1. Replace <source> with the path to the CAB. If your CD-ROM drive is D: this will be D:\win95\win95_02.cab. If this doesn't do the trick, it may be that the Fontext.dll file is missing or damaged. This should be in the Windows\ System folder, so repeat the DOS stuff to rename the old and extract a new copy, altering the paths and filenames to suit.

Lighting-up time

In April's column, I mentioned Peter McGarvey's tip of getting the System Monitor to display modem transfer rates.

Thank you Stuart Taylor and Michael Medai for bringing Charles Turano's Netmon to my attention (Fig 2). This replaces LIGHTS.EXE (the flashing gizmo that appears in the system tray when your modem is online) and shows a graph with the average and maximum send and receive transfer rates. It's shareware, and it costs $10 to register.

Foxy findings

Back in March, we discussed how to replace the Font viewer's "Quick brown fox…" with "Jackdaws love my big sphinx of quartz". This contains just five repeated letters. By June, Kevin Weedon had upped the ante to just two extra letters with "Quick-blowing zephyrs vex daft Jim."

Alan Cox matches this with "Waltz, bad nymph, for quick jigs vex" and goes on to try for the grand slam of 26 letters with "Jump, dogs, why vex Fritz Blank QC?" Well, if Jim is allowed then so is Fritz, but I'm not happy about the abbreviation QC.

Department of obscure tips

Icon with no name

Have you ever wanted to create a nameless icon? If so, you may have tried to use one or more spaces but spoilsport Windows won't let you use space characters on their own. What you can do is use the invisible character produced by holding down the Alt key and typing 0160 on the numeric keypad. Thank you, Laurie Caton.

Log-in leap

If your dial-up networking log-in seems to take forever, try the following tip, from Martin Richter. In the Properties of the connection in the Dial UP Networking folder, clear all "Allowed network protocols" except TCP/IP. I've no idea why this should make a difference but having tried it on both MSN and Wanadoo, France Telecom's ISP, it shaved over 20 seconds off the "Verifying user name and password" box.

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Questions & Answers

Q Is there any way of editing the Win95 shutdown routine: a sort of shutdown equivalent of autoexec.bat? My anti-virus software changed the routine to check the boot sector on my A: drive every time I shut down and I would like to make more useful changes.

Benjamin Garrison

A We've had this before but it was back in the mists of time. So, here we go again. You can run applications and then close down Windows with the batch file in Listing 2. The /W switch ensures each task finishes before the next commences. However, this may interfere with your anti-virus software.

Listing 2 — run apps and close

```
START /W MYPROG1.EXE <parameters>
START /W MYPROG2.EXE <parameters>
C:\WINDOWS\RUNDLL32.EXE user.exe,ExitWindows
```

Q I have a huge file called w95undo.dat on my hard disk. What is it? Does it serve a purpose and can I delete it?

Alex K

A It's the "safety net" file left over when you install Windows 95 over a previous version; it leaves you with the option of returning to the previous version. If you've since installed and become reliant on Windows 95-specific software this won't be a viable prospect. But rather than delete it, get rid of it cleanly by using Add/Remove Programs from Control Panel. Take care that you "Delete Windows 95 Information" rather than "Uninstall Windows 95". As you're ostensibly "Removing Programs" the wording is rather ambiguous.

Q For weeks I have had a DOS notice when I switch on Windows 95 OS: "Invalid setting in the MSDOS.SYS file BOOTFAILSAFE=0". Despite having asked everyone I know, as well as several "experts", I have been unable to solve the mystery.

Richard Aylward

A This is the result of what we "doctors" call a cock-up. There is an entry that can be put in the [options] section of MSDOS.SYS. If BootSafe=1 is present, the system will start in Safe Mode. If this is set to zero, or not present, Windows will start normally. The Windows 95 Resource Kit incorrectly reports the entry as being BOOTFAILSAFE=, so it looks like an over-zealous techy has configured your system.

The best bet is to find MSDOS.SYS in the root folder of your boot drive. It's a hidden file so make sure you have made these visible from View, Options. It's also read-only (i.e. you won't be able to save changes to it) so right-click and clear the read-only attribute from the Properties sheet. Now load it into Notepad and completely remove the BOOTFAILSAFE= line. Don't forget to reset the read-only attribute.

Q After roughly 30 minutes of use, my hard drive pages busily for two or three minutes, hanging applications and stopping work. This also happens straight from bootup, even if I leave the machine alone. I have tried re-installing Windows but it has made no difference.

Andreas Tawn

A I will bet you a hot chicken sandwich that this is the notorious FindFast at work. It comes with MS Office and sporadically creates indexes of your Office documents. I have yet to find anyone with a good word for this and, as noted last month, it can stop Defrag completing. Remove its shortcut from your Startup folder.

If you want to make a thorough job of it, open FindFast, delete all the indexes it has created, (otherwise Office may still try to use them) then Stop indexing and close it.

Q Is it possible to have more than one scrolling marquee screensaver under Windows 95? I have tried saving with different names and the latest overwrites the earlier, even when it has a different name.

Duncan Stewart

A No, the text is not stored in the .SCR file but in a file named CONTROL.INI. But there's a way around it with a hex editor and a sturdy anorak. Make a copy of Scrolling Marquee.SCR under a different name (My Marquee.SCR, for example) in the Windows\System folder. Open this in a Hex editor and go to offset 4192 Hex and change the text of M a r q u e e taking care to preserve the zero-byte spaces between the letters and the length of the string — one letter change is enough.

Save the changes, and you will find that you will have both the original Scrolling Marquee and My Marquee available from Display Properties (Fig 3), each of which will accept its own text.

Fig 3 Yes, you can have multiple marquees with a little hackery

Q In Help, when I select Print Topic it prints in a bold condensed font that is almost illegible and probably uses tons of ink. Can I change this setting to something like Arial?

Edmund Potter

A In a word, no. According to the MS Knowledge base; although you can change the size of the screen font, all printing is done in 8pt MS Sans. This was never intended to be a printer font and, as you have discovered, looks awful. What you can do, however, is copy and paste the topic into a word processor, then format the text to your liking.

PCW Contacts

Email Tim Nott at win95@pcw.co.uk or write to him c/o the usual *PCW* postal address (p10).

NetMon pw1.netcom.com/~cturano/netmon20.zip
Snagit www.techsmith.com

Cosmetic surgery

Panicos Georghiades and Gabriel Jacobs discover Calmira, a program which gives you the functionality and look of Win95 without an upgrade or upsetting your system — it's on our CD.

In our May issue column we answered a letter from Chan Hoi Ching in which we showed how to change the default Windows 3.1 start-up logo to one of your own. David Bradley (bradleydn@aol.com) writes: "*If Chan Hoi Ching's friend does not want the Windows logo to appear during the starting up of Windows, all he has to do is to insert WIN : (that's WIN plus a space plus a colon) in place of WIN at the DOS prompt, or amend his autoexec.bat file accordingly.*"

Yes, this will work if all you want to do is suppress the logo. Microsoft actually recommends that you type WIN plus a space and then F7. This sequence appears as WIN ^@ on the screen. Earlier versions of Windows (before 3.0) allowed you to suppress the logo screen simply by typing WIN followed by a space.

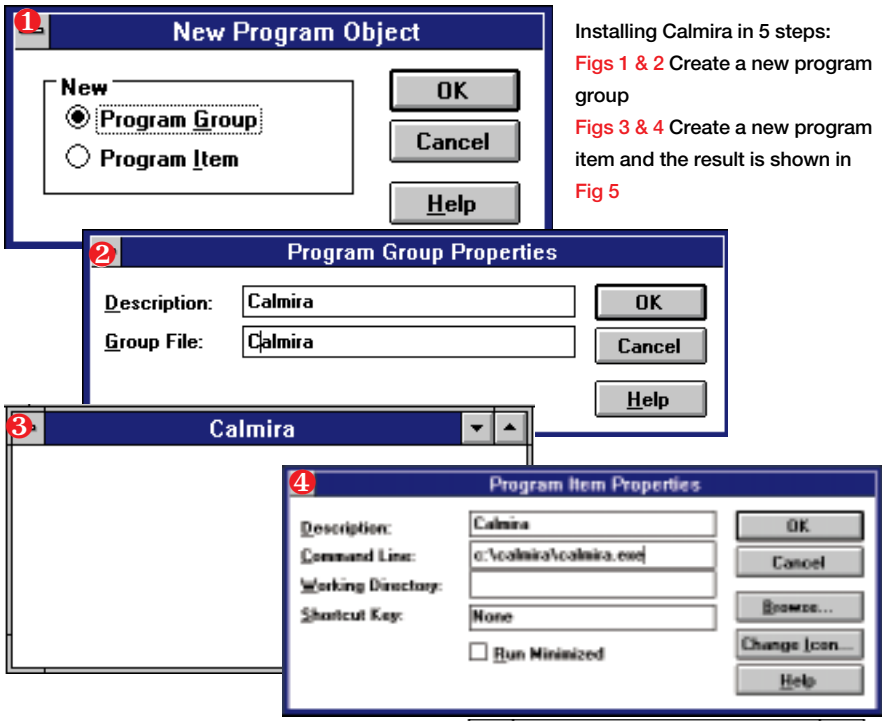
You can also suppress the logo screen by having Windows automatically execute a program at startup, by typing WIN plus the name of a program (this should include the complete path unless you will be starting a program that's in the Windows directory). For example:

```
win c:\msoffice\winword\winword
```

will automatically minimise Program Manager and load MS-Word.

Other things you can do to speed up Windows start-up time are:

1. Get rid of any programs in your Start-up group that you don't use at every session.
2. Defragment your hard disk.
3. If you are using more than one drive, ensure that Windows is installed on the fastest drive.
4. Get rid of any installed fonts which you don't use.
5. Simplify your desktop (get rid of backgrounds).



Installing Calmira in 5 steps: Figs 1 & 2 Create a new program group
Figs 3 & 4 Create a new program item and the result is shown in Fig 5

You got the look

If you wish to obtain some of the functionality and look of Windows 95 but don't wish to upgrade because your hard disk is too small, or you haven't got enough memory, or you don't want to upset a nicely working system, read on.

We have discovered a program called Calmira (presently at version 2.1) which essentially gives you Win95 features with the minimum of fuss. It's available on this month's *PCW* CD-ROM under Utilities in the software library. It does not require any special setting up. Create a directory called Calmira on your hard disk, copy the ZIP file into it and unzip it. Among the files that will be uncompressed will be one called calmira.exe. You can either create an icon for Calmira and run the program whenever you wish, or if you want to use it all the time, you can make it your default Windows interface by editing a single line in your system.ini file. To create an icon:

1. Choose New from Program Manager.
2. Select Program group.
3. Type Calmira in both boxes.
4. Click on OK. (This creates a new empty Windows program group).
5. Select New again and this time choose Program Item.
6. Click on the Browse button and select

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Questions and Answers

Q Thank you for your helpful article entitled *After the Lights Go Out* (page 310, *PCW*, April). I have tried your suggested method of creating a system disk but when I get to the C:\ prompt on exiting Windows 3.11 and type in your suggested "formula", my machine just returns to the C:\ prompt. I also have tried it by getting to the prompt from Program Manager but with the same result.

John Ainsworth
john.ainsworth@virgin.net

A You are in fact referring to Lynley Oram's article which was meant to prepare you for that unfortunate day when disaster strikes. This is the day when you switch on your machine and the hard disk will not start. You will be absolutely stuck and will not even be able to get to the hard disk to find out what the problem might be.

It is vital that you have a system disk ready for the dreaded day and so we will take the opportunity of re-iterating some pretty basic but important stuff.

There are three ways to create a system (start-up) disk for machines with DOS and Win 3.1 or 3.11 installations. You will, of course, need a floppy disk. If you have a formatted one that contains files you don't wish to erase, but still has some empty space, do the following:

From DOS (before you start Windows) at the C:\ prompt, enter:

```
c:\>sys a:
```

This should copy the system files from the hard disk to the floppy disk without re-formatting it.

If this does not work, it can mean one of two things. Either the DOS directory is not defined in the PATH statement of the autoexec.bat file, in which case edit the autoexec.bat using DOS Edit, save the file, reboot the machine and try again. Or it could be that the sys.com file is missing from your DOS directory. This means you have a bad DOS installation and you should re-install your MS-DOS files from your original disks. If all works fine, you will get a message saying that the system has been transferred.

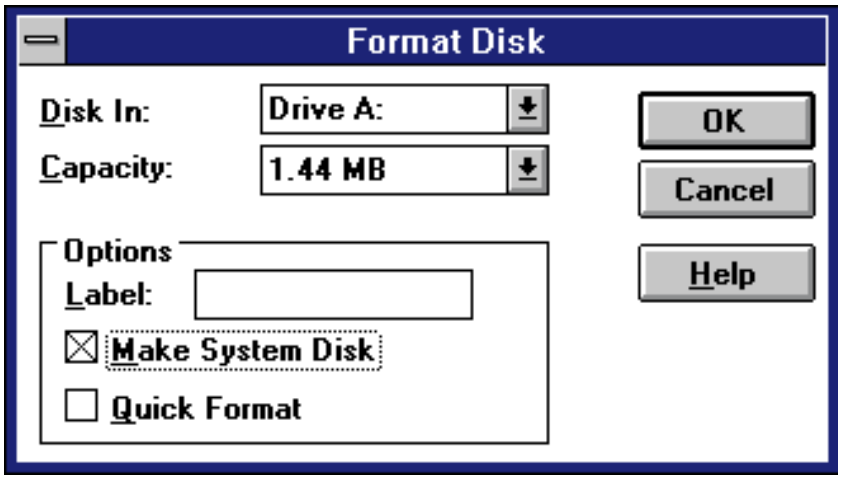
If you use an empty floppy disk, you can make it into a system disk when you format it. Do this from the C:\ prompt before you start Windows or from within Windows (from the MS-DOS prompt). Just enter:

```
c:\>format a: /s
```

Or, from the Windows File Manager, choose Disk/Format and select the Make System Disk option.

All the above methods copy five MS-DOS files to the floppy disk: two hidden ones (io.sys and Msdos.sys), and three which you can see (command.com, autoexec.bat and config.sys). The floppy disk can now be used to boot the machine if the hard disk fails.

The config.sys and autoexec.bat files created have standard settings, so the best thing to do is to copy your existing config.sys and autoexec.bat files onto the system disk you have just created.



It is important to have a System disk (boot disk) available in case your hard disk or your MS-DOS installation get corrupted

the calmira.exe file from the c:\calmira directory.

7. Click on OK.

To set it up as the default Windows shell, choose Run from Program Manager, type:

```
c:\windows\system\sysedit.exe
```

and select the system.ini file. Then change SHELL=PROGMAN.EXE to SHELL=C:\CALMIRA\CALMIRA.EXE, save, close and restart Windows.

Which features get a makeover?

You get an icon-based File Manager which displays each directory in a free-floating icon window. Each file in a directory is shown as an icon and by clicking the right mouse button on a file you get a number of options, one of which is to attach a meaningful description to the file.

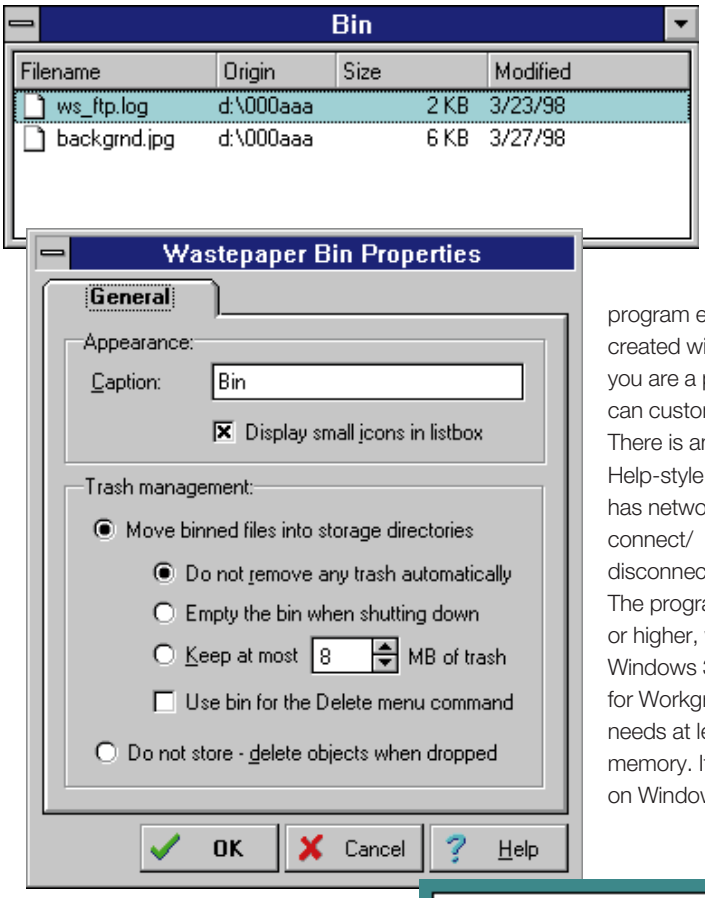
This description is instead of the long file names of Windows 95 — it does not replace the 8.3 DOS filename structure, but it does give you an additional (more meaningful) method of referring to files.

The directory/file tree structure is like Windows 95's Explorer and shows disk drives as well as folders. Calmira also shows user-defined icons for every file according to its type. The type is really its Association in File Manager. BMP files for instance, which are by default associated with Paintbrush, show the Paintbrush icon unless you've associated them with some other program, say Paintshop (in which case a Paintshop icon is shown). Text files (TXT) normally associated with Notepad show with a Notepad icon, and so on.

A very useful feature is the Wastepaper Bin (like the Windows 95 Recycle Bin). You can drag and drop icons into the bin to move files/folders to a hidden directory (a temporary delete storage space). You can have one Wastepaper Bin for every hard disk on your PC and you can set it up so that files get cleared (deleted permanently) when they're at the bottom of the bin and the bin's contents reach a certain size.

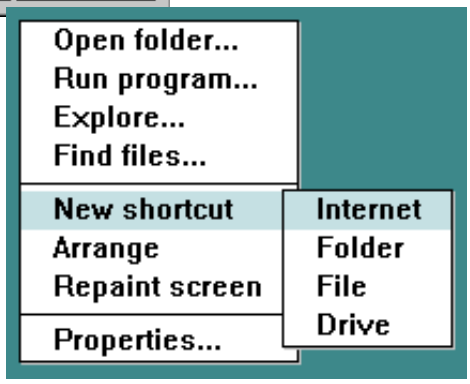
Shortcuts are available. If you drag any file icon from the pseudo-Explorer onto the desktop, an icon is created which starts the file/program. You can create alias files that point to other objects, and drag and drop objects into desktop shortcuts and aliases.

Of course, there is the Win95-style Taskbar at the bottom of the screen. This displays buttons for programs, icon windows and Explorer. The Clock, which is now constantly available, also shows free memory and resources. A system tray



Left Calmira's Wastepaper bin **Below, left** Setting Waste-paper properties

program executables were created with Delphi and if you are a programmer you can customise it further. There is an 80-page online Help-style manual. Calmira has network support to connect/disconnect remote devices. The program requires a 386 or higher, works on Windows 3.1 and Windows for Workgroups 3.11, and needs at least 4Mb of memory. It does not work on Windows NT 3.51.



enables you to dock small utilities. From this, you manage program windows and terminate tasks. The Taskbar can stay on the screen or pop up when required.

The Windows 95 Start menu provides you with nested program groups and items to any level, it opens folders and dialog boxes and gives you a Shutdown dialog box to quit, reboot, or restart Windows — Calmira gives you the same facility.

You can choose any icon or bitmap file for each menu item and there is a tree-based drag-and-drop menu editor. You can also customise and fine-tune the program to your own preferences with over 100 user-controlled settings: change screen colours, fonts and dimensions, assign icons and hot-keys for shortcuts, and so on.

In fact, the complete source (over 700Kb) is included in the package. The

Top Clicking the right mouse button opens a pop-up menu from which you can create shortcuts to documents, programs and even to the internet **Above** Calmira's Taskbar

PCW Contacts

If you have any queries or Win3.1-related topics to discuss, contact Panicos Georghiades and Gabriel Jacobs at win3@pcw.co.uk

Further information about Calmira is available at www.tribbles.demon.co.uk/calmira/

Watch that space

Beware the space bar when NT boots, warns Andrew Ward. He advises on ways to avoid complete system shutdown. Plus, there's a workstation version of Seagate Backup Exec.

Reader Alan Telford raises a very common complaint: that the message stating "Press space bar now" which appears when NT boots, encourages users to do just that, and with dire consequences.

On one occasion, writes Alan: "*This had the unfortunate effect of making the system unusable with the chromatography package we run on that PC. It meant calling out an engineer to fix the problem, at considerable expense.*" What happens is that pressing the space bar causes Windows NT to revert to a saved version of the registry. But on most systems, the saved version is very old owing to the fact that no-one has regularly updated it. As a consequence, much of the hardware and software on the machine will no longer function. There are several things you can do to prevent this happening.

First, you should regularly update the repair information. For example, after a new application has been installed and you are confident that the system is working properly, run the RDISK command and click on Update Repair Info. You should ideally make a new recovery disk at the same time using the same command.

Secondly, take regular tape backups of the registry using the supplied Backup utility, or something like Seagate Backup Exec for NT Workstation (*see below*). Then, if anyone does press the space bar and overwrites the current registry with an old one, you can always recover it from tape.

Thirdly, you can install a second copy of Windows NT on the hard drive. By booting that version instead, you can manually take backups of the normal registry files simply by copying them. For instance, you could copy all the files in D:\WINNT\system32\config to D:\WINNT\system32\config\backup. If a problem occurs, reboot with your spare copy of NT and copy the registry files back.

Finally, you can manually hack the file that produces the "space bar" message to remove or change it. Anyone who is competent with a hex editor ought to be able to do it (but should first try it on a test system). The file to be modified is ntldr and is hidden in the root directory of the system drive. Make one mistake and your system is unbootable, so keep a boot floppy and don't blame me if it ends in tears!

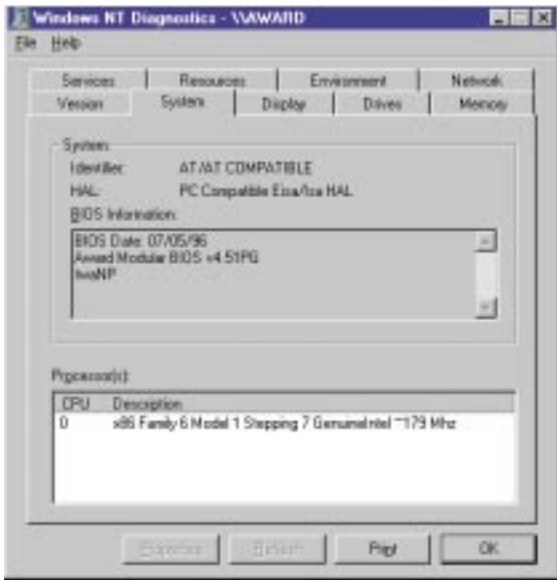


Fig 1 Check processor stepping level for multiprocessor systems

Year 2000 *non-compliance*

This is just a quick note to warn the unwary (and you may have difficulty believing this) that Windows NT 4 is *not* Year 2000 compliant — even in its latest incarnation with service pack 3.

Windows NT erroneously believes that the year 2000 is not a leap year. How anyone could make this mistake absolutely staggers me. It is almost beyond belief. Maybe the Microsoft programmers never went to school and so didn't learn the rules for leap years? Well, OK, some of them did: some routines in NT 4 *do* know that it's a leap year, yet others don't (clearly, Microsoft does not go in for code re-use, either).

Anyway, whether you like it or not, you will have to upgrade to service pack 4 (about to go into beta as I write) if you expect to keep Windows NT 4 systems running into the year 2000. And according to what various industry pundits are saying, most of us would be wise to do that, rather than rush into NT 5 when it appears next year.

● *We will endeavour to put service pack 4 on the PCW CD-ROM, as and when it is released.*

Keep in step

Readers Hugh Price and John Berbuto have pointed out that when using multiple processors with Windows NT, it helps to use the same stepping.

If in any doubt about which stepping you have, run WINMSD, select the System tab and look in the Processor(s) box (Fig 1). All should become clear. This requirement rules out the possibility of starting out with one processor and buying the second later, so to ensure getting the same stepping, you'd have to buy all processors at the same time.

I haven't heard from anyone who's tried

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Book reviews

Gone are the days when computers were supplied with a couple of bookcases full of manuals, but the irony is that as Windows NT gets more sophisticated, it now exceeds the complexity of those mainframes of yesterday. As a result, purchasing additional documentation is unavoidable for the NT professional, so here are three trusty tomes for your consideration.

Mastering TCP/IP for NT Server

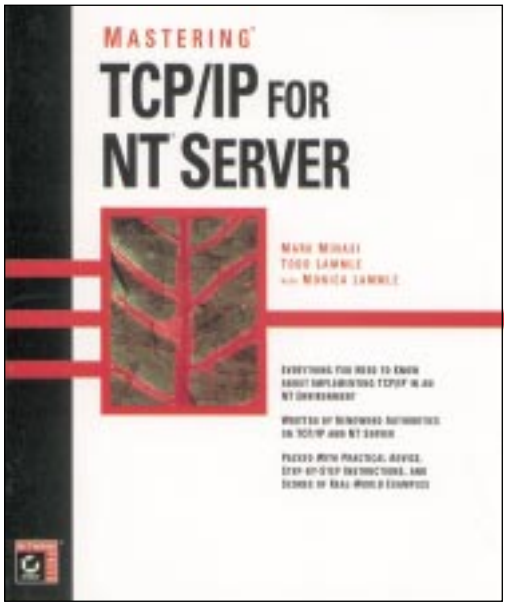
This ambitious volume aims to cover TCP/IP from its birth, right up to the Routing and Remote Access Service for Windows NT 4.0 (formerly "Steelhead") — and it succeeds.

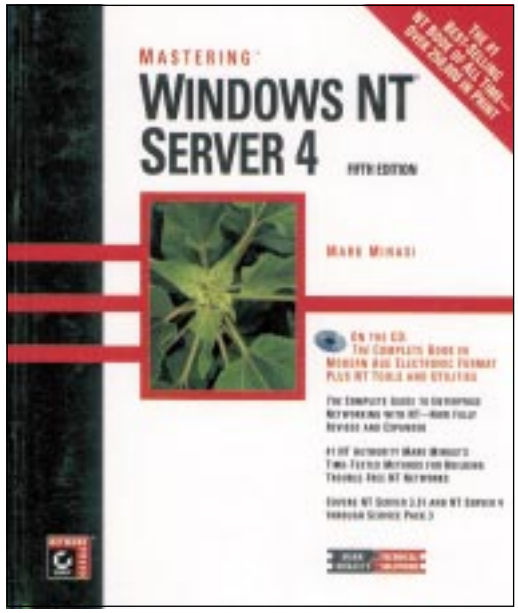
There are the conventional sections on TCP/IP protocol layers and issues like subnet masks, and these are interspersed with hands-on examples of setting up TCP/IP networks under Windows NT 4.0.

It's pleasant to find a book that takes the trouble to explain how things work and why, rather than just taking you step-by-step through setup and configuration screens. And when it does explain how to set something up, it also takes you through testing the resultant configuration, with explanations as to what might have gone wrong if it doesn't work. Above all, this isn't a sycophantic eulogy of Microsoft's prowess: whenever the authors have found something dodgy or unpleasant, they tell you so you know what to avoid.

Intricacies of DHCP, WINS and DNS integration, and name resolution under WinSock and NetBIOS (there are gorgeous flowcharts) all receive diligent attention. Internet services like the FTP server, web server and proxy server get a mention but remember that these things change faster than anyone can print books!

This is an invaluable (but pricey) aid for anyone involved in Windows NT TCP/IP networking, which these days means just about anyone who works with Windows NT.





Mastering Windows NT Server 4, Fifth Edition

It's hard to do a 1,600-page book justice in a couple of hundred words. Rest assured that Mastering Windows NT Server 4 covers pretty much all you'd care to know about NT, from Windows NT 3.51 to Service Pack 3.

The chatty style makes the book readable but does rather add to the page count. This is bedside reading, rather than a quick-dip reference work, but once you've read it, you'll have learnt your stuff. Everything is explained extremely clearly and the author takes you step-by-step through the understanding of complex issues. You'll remember the answer, because you've painstakingly gone through the whys and wherefores.

How about those things you often need to know how to do, but are impossible to find in any book — even when you are sure they're there? Well, this issue is addressed by a rather natty "How do I?" section at the back of the book, pointing you to the places that answer questions such as "How do I create a generic boot floppy?".

Unusually, the accompanying CD is not full of the cheap utilities you normally get but some really useful stuff, such as the Kane Security Analyst and Security Monitor, and Diskeeper Lite. Of course, most of the software is shareware, so you must register and pay for it if you decide you like it, and you'll probably want to go out on the web to obtain the most up-to-date versions, anyway. But full marks for effort. Oh, and the full text of the book itself is on the CD, too.

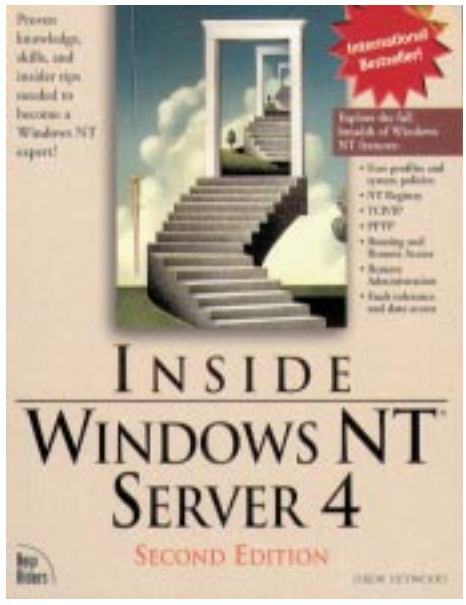
Inside Windows NT Server 4 Second Edition

Windows NT doesn't stand still. Although no new version since 4.0 has been launched by Microsoft, the service packs and other add-ons, such as the Windows NT Routing and Remote Access Server, have considerably enhanced and altered both the face and internals of Windows NT 4.0.

This second edition of *Inside Windows NT 4* addresses this with the addition of new chapters specifically devoted to the subjects of routing and remote access server, Microsoft proxy server and clustering Windows NT servers.

Furthermore, the chapter describing Microsoft Internet Information Service has been substantially revamped to reflect the release of IIS version 4.0 — but be warned, this is by no means a complete reference to setting up a web site.

To make room for the new material, gone from the book (thankfully) are some of the more basic chapters like Understanding Networks. And the CDs, with their collection of useless shareware, have been junked (did they read my review of the original edition?).



The new chapters are very helpful. Routing problems such as "slow convergence" and "count to infinity" are clearly explained with useful diagrams. And the presence of hands-on tips reassures you that the author has done more than just read the manuals and actually uses some of this technology himself. A useful reference work to keep handy.

p263 ➢

different steppings and had a system fail to work as a result. So, is this just a sensible precaution or an absolute necessity? Has anyone out there experimented, and come to a definite conclusion?

New folder windows

Many thanks to Anne McCormick who wrote in with an answer for Matthew Willard on how to set the default views for a new folder to Details, while leaving the My Computer window with large icons.

Assuming you have multiple folder windows enabled, Anne says you should open the My Computer folder and arrange the View settings to suit your preferences. If you then hold down the Control key and double-click the C: drive, you should see a view of the C: drive within the same window and with the same settings. Close this window and re-open My Computer (which should still have your preferred settings), then repeat this process for each drive letter on your system.

The final step is to open the My Computer folder, reset it to large icons, turn off the toolbar and close it (assuming that's how you like it).

According to Anne, this procedure (actually gleaned from our *Hands On Windows 95* column some time last year) does work for Windows NT but the changed settings won't last forever; eventually they'll get reset, which could happen after a few days or a few weeks.

Backup Exec hits WinNT Workstation

You're sure to know of Seagate Software's Backup Exec for servers but there's now a workstation version. It really is a great deal more pleasant to use than the Microsoft-supplied Windows NT tape backup program and has substantially more versatility. It's also written for Windows NT 4, so it won't include the recycle bin directory when backing up, whereas Backup just treats it as a normal directory, requiring you to manually deselect it if you don't want it. And, you don't have to go through that irritating process of selecting hardware compression and registry backup every time.

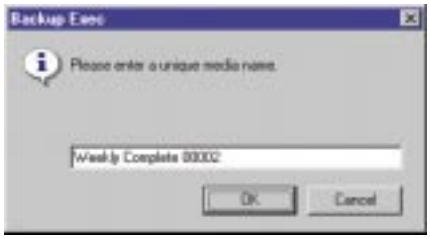


Fig 2 **Clearly the word unattended means something different in Seagate World**

I did find one "gotcha": you can configure Backup Exec for what is claimed to be an unattended backup. However, if it's the first time you've used that tape, when you return to your system after the obligatory four-hour lunch break, you'll be somewhat dismayed to find the dialog box (Fig 2) patiently waiting for you to give the tape a name before it starts copying.

Of course, Backup Exec offers everything you'd expect in the way of scheduled backups: overwrite or append, complete or incremental. And at the end of the job, there's a button to click to view the error log (and there always is at least one — people do seem keen on writing processes that hang on to open files to the very last). You can choose what you do and do not want logged.

Many users won't need to create and schedule back jobs at all: the one-button backup function uses default settings that will suit many environments. A full backup is performed the first time and thereafter differential backups are carried out until ten backups or seven days have passed.

Foreign Legion?

Remember "Legion — The Hosts Master" that I mentioned in the May issue? By populating your HOSTS file, it can speed web browsing by saving on DNS lookups. But there's a catch. If someone's IP address changes, your HOSTS file doesn't and you end up being unable to access their web site.

This happened to me with www.microsoft.com. In theory, it doesn't matter two hoots since I usually access www.eu.microsoft.com anyway. But if you're trying Active Setup for something like Outlook 98, you are in deep trouble and it can take a surprisingly long time to figure out why.

PCW Contacts

Andrew Ward can be contacted at NT@pcw.co.uk or write to him at the usual *PCW* address (p10).

Reviewed books are available from Computer Manuals 0121 706 6000, www.compman.co.uk
Inside Windows NT Server 4 Second Edition (reference 311530) £36.50
Mastering TCP/IP For NT Server (reference 282731) £41.50 .
Mastering Windows NT Server 4 (5th Edition) book & CD (reference 299658) £55.50

Small but perfectly formed

Mark Whitehorn kicks off our new column about PDAs. He is prepared to hand out tips and tricks, and sort the software and peripherals. First off, he feels the form in the PDA market.

Welcome to this new *Hands On* column dealing with PDAs (Personal Digital Assistants) — those compact little computers that have become so popular. There has been a rapid proliferation of such machines, ranging from small-but-perfectly-formed laptops to tiny organisers for holding telephone numbers.

It is impossible to cover all comers in this broad spectrum of devices so I'll concentrate on the mid-range, leaving aside the laptops and electronic address books. In this range there is an enticing group of fascinating and diverse machinery, which is powerful enough to warrant discussion of tips, tricks and tweaks, and additional software and hardware.

Within this group there are three major players: the Psion range (Series 3 and 5); the Pilot series (the most recent version has been renamed Palm III); and Windows CE machines. These are the palmtops on which I intend to concentrate. This month, I'll look at the three basic palmtop types and their strengths and weaknesses.

The Psion Series 5 has a touch-sensitive screen

Two brains are better than one

Despite being a daily user of a Psion, I am concerned not to be partisan about any particular device and I'll try not to fall into the two-brain trap. You know, the one that afflicts most users of palmtops (or indeed, most users of pretty much anything).

Before they buy a palmtop, most people use Brain Number 1. That brain looks at all the relevant sources of information, listens to all that's said and reads all that's written, about each of the machines under consideration. It carefully weighs up the pros and cons and, with a fully open mind, makes a choice. But as soon as the moolah has been handed over, Brain Number 2 snaps into gear. The chosen palmtop is suddenly elevated to the status of a minor deity: it is perfection personified; other machines are not even worthy of comparison; only total dimwits could possibly have selected any other machine. You may well recognise the condition!

I am a sucker for gadgets in general, so I genuinely do like all three of the machines we're considering here. Each has its strengths and weaknesses and what you buy depends on what you need. Since some readers may be still in the throes of choosing a machine, I'll try to outline the perceived strengths and weaknesses of various machines. So, here is a thumbnail sketch of each for prospective buyers or those considering an upgrade.

Psion of the time

When the Series 3 was launched it was startlingly innovative and remained so until it was eclipsed by the arrival of the completely overhauled 3a. The 3c that followed was not a major upgrade, although there were some notable differences. The most recent version is the Series 5 and it is on this and the 3c that I shall concentrate. However, much of what's said of the 3c will also be true for the 3a.

Psion 3c

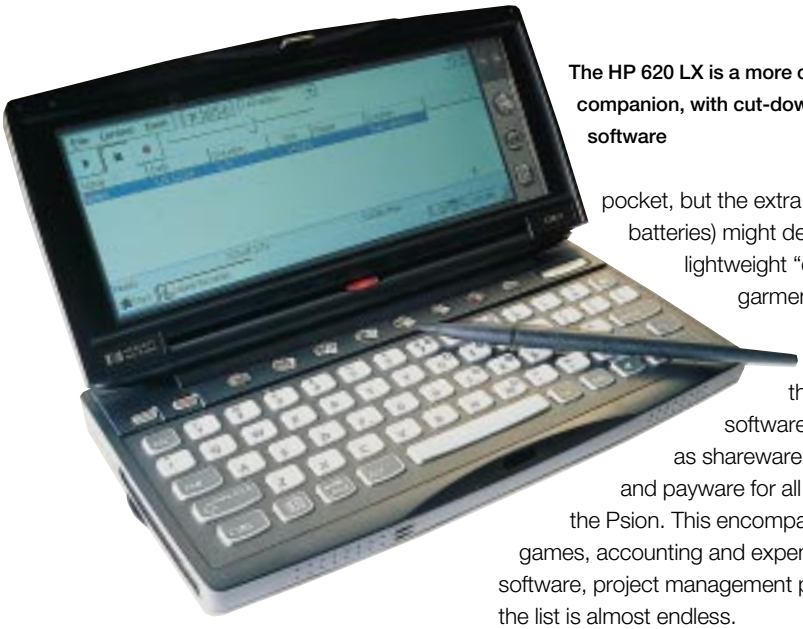
The Psion 3c is a natty palmtop measuring 16.5 x 8.5 x 2.3cm and weighing 275g (just over half a pound for non-EU compliant brains). It's a pleasant, elegant shape and fits neatly into most jacket pockets without being obtrusive.

The heart of the Psion is its proprietary operating system, the Psion EPOC 16, which is invisible behind the GUI interface. The interface is straightforward and I've never heard any complaints that the Psion is difficult or particularly unintuitive to use.

It has a small qwerty keyboard which touch-typists with tiny hands can use — I hunt and peck. The screen is so legible that the backlight is not often required but when used it is very effective. The battery life from two AA batteries is excellent (I get about 35 hours) and helped by the infrequent need for using the backlight.

The screen is not touch-sensitive so everything is keyboard driven. It comes with the usual range of applications, including a word processor, spreadsheet, contacts database, agenda, calculator and world/time features.

• The street price for the 3c is between £230-£250 (ex VAT).



The HP 620 LX is a more colourful companion, with cut-down Windows software

Psion 5

The Psion 5 gives an odd lurch in your hands when you open it as the keyboard slides forward to meet you. Its keyboard appears to be larger than that of the 3c but careful measurement shows that it is almost the same width, and only slightly deeper. The keyboard also seems different because the keys have sloping sides and are packed closely together, whilst those on the 3c sit as isolated islands in oceans of space. Most people find the 5's keyboard an improvement over that of the 3c.

The reason for the sliding action is not to make the keyboard bigger (despite reports to the contrary): it slides in order to move the centre of mass forwards, which ensures that the palmtop does not tip over when you tap the screen with the stylus. Yes, touch-sensitivity has arrived for the Psion.

The additional complexity of the sliding action and touch sensitivity are not without their drawbacks. On my first 5, the slide mechanism feels gritty and uncomfortable.

The readability of the touch-sensitive screen is definitely worse than that of the 3c. This poor visibility results in increased use of the backlight and a concomitant reduction in battery life. I get about five hours from two AAs, which is still much better (and more convenient) than you could expect from a laptop. Slip a four-pack of AAs into a pocket and you could use the Psion continuously on a flight to Los Angeles. Doing the same with a laptop would consume half your luggage weight allowance in spare batteries!

The operating system was entirely re-written for the 5 and re-named EPOC, but the range of built-in applications remains much the same. It still slips into a jacket pocket, but the extra bulk (and batteries) might derange a lightweight "designer" garment.

A vast array of third-party software is available as shareware, freeware and payware for all flavours of the Psion. This encompasses games, accounting and expense tracking software, project management packages — the list is almost endless.

• The price of a Psion 5 is around £370-£400 (ex VAT) for the 8Mb version.

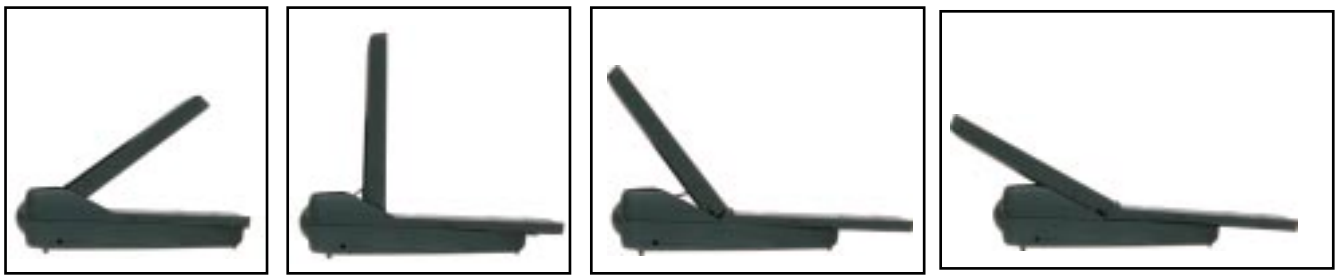
Don't Win CE, it's Windows

Windows CE is software rather than hardware and because different manufacturers have built palmtops to run it, a whole range of machines is available. Microsoft's Windows CE (often contracted to Win CE and pronounced, somewhat disparagingly, as "wince") is a cut-down version of the Windows 95 operating environment. You don't get all the functionality of 95 but you do get much the same look and feel from the menu system and the cut-down versions of applications that run under it.

Hewlett-Packard 620LX

The specific Win CE machine I'm looking at is the Hewlett-Packard 620LX with colour screen. It's very much at the top end of what's available but is a good example of what CE machines are aiming at, namely something that's as similar to Windows 95 as possible. The screen is touch-sensitive and the qwerty keyboard is fine. It has an excellent screen, a permanent backlight and runs off rechargeable lithium-ion batteries. These are neat and recharge whenever the HP is plugged into the mains. Figures for battery life are hazy and I have no specific measurements as yet because the machine is fairly new. The major advantage of the HP 620LX is instant familiarity for users of Windows. The hassle of learning something new is removed and this is likely to prove appealing to many.

Even a cut-down version of Windows and associated applications needs a reasonable hardware specification to run



The innovative keyboard hinge on the Psion 5 moves the weight forward so the machine doesn't tip over when you tap the screen

well and the HP is noticeably larger and heavier than the Psions. It measures 19.5 x 10.5 x 3.5cm, which doesn't sound much more until you do the volume calculation which reveals that the HP is well over twice as bulky (and about twice the mass).

In time, it is likely that the supply of third-party applications to run under Windows CE will expand in the same way as they did for the Psion.

• Costing between £550 and £600, the HP palmtop is an expensive purchase and VAT must be added to those prices, too.

Palm III

This is the latest in the series that began with the Pilot and moved on to the Pilot Professional. The Palm machines are totally different from the Psions and Windows CE machines. For a start, the Palm III has no keyboard. It looks more like a notepad. The majority of its face is taken up with a touch-sensitive screen with few buttons set out beneath. The main method of driving it, therefore, is with the stylus. It is a small, lightweight, machine measuring 12 x 8 x 1.5cm and weighing in as the lightest of all.

The Palm III is a lot less like a PC in other ways, too. There is no spreadsheet and no word processor and the memo writing facilities that are present are not geared towards heavy-duty text manipulations.

You cannot type text into the Palm III from a keyboard. Instead, it uses Graffiti character-recognition software. This translates characters, hand-written on the lower section of screen, into alphanumeric characters displayed in the upper section. Some effort is required to learn the way to form characters so they will be translated correctly by the Graffiti software but this isn't a major undertaking as most of them correspond with the natural way of writing (with a few exceptions).

Screen legibility is fair; improved with use of the backlight but subject to the usual battery drain when it is. Battery power comes from a pair of AAAs which last a *loooong* time and are so tiny that carrying spares isn't arduous.

• At the time of writing, the Palm III is not yet on general release. Prices for its predecessor, the Pilot Professional, range from £215-£230 (ex VAT).

Going the Win CE way

■ The main motivation for many people using computers in all their guises is to get things done. Time spent learning a new system, even one as straightforward as the Psion's or Palm III's, is perceived as a waste of productive time.

Therefore, given the choice of a new GUI, or a slimmer version of an already familiar GUI, taking the Windows CE route is, for some, the natural choice.

The main considerations

In general, each palmtop is best suited to a particular job or a particular way of working. Before deciding which to buy, consider your needs and look for the best match.

Both hardware and software should be considered. For instance, if your pockets already sag from carrying phones, pagers and the like, size and weight will be important. Or if you haven't the time or inclination to learn anything new, the interface familiarity of Windows CE machines will be attractive.

The Psion is a good all-rounder, but could be seen as a compromise resulting in a jack-of-all-trades, yet the success of the Psion shows that it manages to be master of most. The keyboard, despite being tiny, is easy to use by hunt-and-peck typists and by touch typists with small hands. Over the years I have typed hundreds of thousands of words on my Psion keyboard (mainly while on trips abroad) so it is definitely an easy and robust way of entering text. As a personal organiser to manage phone numbers, addresses and appointments it is very competent and the spreadsheet and word processor have perfectly respectable functionality.

The major selling point for Windows CE machines is the similarity to Windows, which represents a non-trivial edge over the opposition. Compatibility between the two operating systems extends to such things as file formats, and although the Psion has file conversion utilities, it does increase the complexity. A Windows CE machine is much more like a tiny laptop; it's more chunky than either of the other palmtops and is no longer so pocketable.

The Psion company researched the ideal size of a palmtop when prototyping the Psion 3 and found that the results showed bands of acceptable sizes. Too small, and it was impossible to type on. Too large, and it was voted too awkward to carry around on one's person.

In my opinion, the Hewlett-Packard 620LX just oversteps into the latter category. I have found myself sliding it into my briefcase for journeys, rather than slipping it into my pocket (the invariable resting place of the Psion). Your jacket would need to be stout and boast a poacher's pocket to house the HP safely, and with anything approaching elegance. Also, the HP620LX is an expensive option, costing as much as some laptops.

The Palm III is excellent but it is for a completely different type of task. Many people keep contact information and an agenda on their desktop PC. You can keep a copy of these on the highly portable Palm III, and with the software supplied it's an easy matter to keep the two copies synchronised. It's fine for making notes but it's not really kitted out for writing a novel, although even as I type, I am totally convinced that someone, somewhere, is no doubt engaged in proving me wrong.

● *Next month we will start having a look at a few tips, tricks and useful URLs.*

PCW Contacts

Mark Whitehorn welcomes suggestions from readers and can be contacted at the usual *PCW* address (p10) or via email at pda@pcw.co.uk

The tar's **the star**

"I'm a gnu. How do you do"... Chris Bidmead introduces you to gnutar, a nifty way round the problem of multi-PC backup. And for those hopelessly lost with Linux, help is at hand.

In the old days, when I had several computers to back up and only one tape device, I used to shift the backup machine from computer to computer. These days, I try to work smarter. As luck would have it, the people behind gnutar are ahead of me on this.

In previous months we've been exploring the use of tar with a local device, thus:

```
tar cvf /dev/nst0 <dir>
```

which backs up <dir> to the local tape device /dev/nst0. But what if the tape device is attached to another machine on the network? Gnutar allows you to describe the remote device directly. Instead of the command above, you type something like:

```
tar cvf bidmead@pc315:/dev/nst0
<dir>
```

where "bidmead" is a valid user on the remote machine. Obviously you choose a user who has permission to write to the tape device. I cheated and gave universal read-write access to /dev/nst0, but this would probably not be the best thing to do on a multi-user network.

Backing up from the Apricot LS550 running Caldera OpenLinux to the HP24DAT device attached to the IBM PC315 running RedHat 5.0, worked immediately. But when I tried the same thing from gnutar on the NeXT, I got the error message "/etc/rmt not found".

/etc/rmt was new to me, but the man page assured me it's the remote magnetic tape handler that uses interprocess communication (hairy, indispensable stuff: see "The Linux Programmer's Guide" at linuxwww.db.erau.edu/LPG). But when I looked in /etc, the rmt binary was there.

Then I realised my mistake. The NeXTStep implementation of gnutar was looking for it on the remote machine, the IBM PC315. I tested this by using the "touch" utility to create the required file in the PC315's /etc directory, and when the gnutar complaint changed to one about file permissions I knew I was on the right track. As it happened, a genuine rmt was already

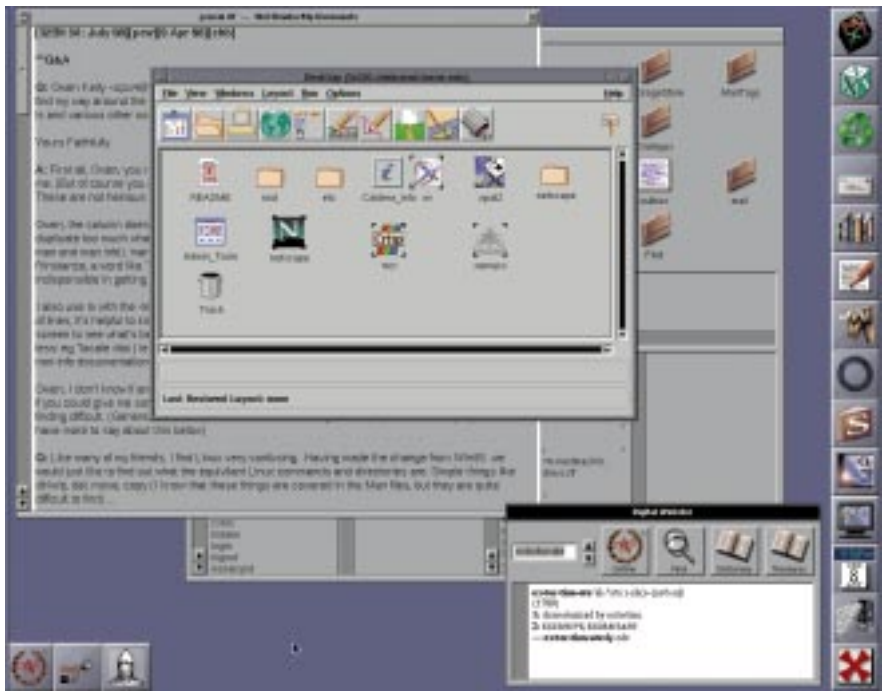


Fig 1 (above) My NeXTStep desktop supplemented by the LookingGlass desktop supplied with Caldera OpenLinux Lite Fig 2 (left) It was the splendid online magazine Slashdot (slashdot.org) that drew my attention to Moonlight

Hit me with your emails — but not too hard

Thanks for your help. How you find the time to write your column and reply to questions by email is beyond me.

Gilgongo

gilgongo@phreak.co.uk

Me too, Gilgongo. I've discovered I'm writing about 5,000 words a week in response to your emails!

Your email queries are coming particularly thick and fast following the offer from Ben Partridge of Avalan a couple of months ago for free copies of Caldera OpenLinux Lite. Ben tells me that at one time, readers' requests were running at a rate of 250 a day.

His own stocks were fairly quickly exhausted, so if you weren't among the first in the scramble you may have had to wait for the new batch of CDs that were shipped direct from the US. (That should be sorted by now but, if any of you are still waiting, I'd like to know.)

Incidentally, I've been very impressed with Ben's efforts to promote Caldera over the past couple of years, so it came as something of a shock to learn that Avalan's relationship with the US company has now been terminated. No, Ben didn't throw in the towel because of the inundation from my readers — far from it. This is some sticky political stuff, I gather.

So Ben tells me that for UK readers seeking further news of Caldera, the best contact is Starstream Communications (sales@starstream.co.uk).

I relish these emails of yours, so do please keep them coming. But let me reiterate some ground-rules here. Let's try to comply with RFC 1855, which is an official(ish) document about how to do emails (and other things). I won't give you a URL for this as it's all over the internet — just use your favourite search engine. In summary, it says: "Be polite, and don't take up more bandwith than you need to".

This second point invites you to prefer plain ASCII (not HTML or, Heaven forfend, mime-encapsulated Microsoft Word documents). It also suggests that you shun the mob of people who quote their correspondent's entire previous mailing back to them just to respond to a few simple points. Use quotes from the mailing you're answering to anchor down the context, but take some time to edit them down. A little care applying Occam's razor at one end of the correspondence saves a lot of time at the other.

I hope the advice I give, both in the column and by email, helps to get the job done. If it doesn't, I want to know about it, so that I can give better advice next time.

on pc315, but it was in the /sbin directory. So all I needed to do to stop gnutar whining was to create a symlink from /sbin/rmt into /etc, like this:

```
ln -s /sbin/rmt /etc
```

After this, I found that tarring from the NeXT machine across to the remote tape drive worked perfectly.

Connecting to your ISP

Kanaley (kanaley@netinfo.com.au) has drawn my attention to something about which I get a lot of correspondence. I've been referring people to the PPP HOWTO to set up their machines for net connection (the document focuses on Linux, but like many of these HowTos is generally applicable). He points out that the tricky question of PAP/CHAP authentication is in the ISP-HOOKUP HOWTO. You can find these HowTos in many places, but I recommend going to www.linux.org and following the embedded "documentation" link you'll find there.

Looking for a desktop

Ed Ross (edross@pavilion.co.uk) has noticed that the LookingGlass desktop that comes with Caldera OpenLinux Lite only lasts for 90 days. He wonders if there are any free desktops he can install instead, preferably one that can be ordered, rather than downloaded (expensive).

On the disk already is fvwm, a window manager and desktop. Yes, I'm afraid it is time-bombed, so you will need to buy the full OpenLinux Standard product if you intend to go on using LookingGlass (Caldera recently dropped its prices, I'm happy to report). But fvwm is pretty good. It makes a great desktop and you've got all of 90 days to read up about how to set it up!

There is one very nice thing about LookingGlass — the way you can float it off across the network wholesale on to another machine (Fig 1, opposite). See www.plig.net/xwinman for a sample of various window managers and desktops that are available.

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Questions & Answers

Q As a relative newcomer to Linux, I am finding it difficult to find my way around the operating system. Would it be possible for you to write a section on the basics of the operating system, like ls and other commands?

Owen Kelly
cpx4@hotmail.com

A The column does keep cycling around these important entry-level questions, but I don't want to duplicate what people can find out by using the man pages and the info command (see man man and man info).

```
man -k <something>
```

can help to get you started, if <something> is, for instance, a word like "network" or "file". The "which" and "locate" commands (see man pages) are indispensable in getting your bearings.

I use ls with the -last switch a lot to inspect directories. If something like "locate" generates a lot of lines, it's helpful to know that in Linux, the <Shift>-<PgUP> key combo can usually scroll back the screen to see what's been lost off the top.

A more Unixy way to do this is to pipe the output through less: e.g. "locate doc | less". Incidentally, this is a useful way of finding out where the non-man and non-info documentation is lurking.

Q Like many of my friends, I find Linux very confusing. Having made the change from Windows 95 we would like to find out what the equivalent Linux commands and directories are: simple things like dir/w/p, del, move and copy.

A Yes, you've hit the problem right there. If you're looking for a switch to ls that pages the output, you won't find it (on the Unix systems I'm familiar with). Typically, if you want this, you'd pipe through less: "ls | less". A rough equivalent to /w is the -m switch to ls.
On many modern Unix systems, "dir" is a synonym of ls, but then I guess it's probably a mistake to think in terms of equivalences. Linux and Windows 95 do different things, and do (some of) the same things quite differently.

Q As someone who is extremely confident in DOS and all the features of Windows 95 such as the registry, it is very frustrating to have to get to grips with a new operating system. But then again, we all have to start somewhere!

A I know what you mean. And the man pages don't always help. For instance, I notice that the RedHat 5.0 man system seems to be broken, in the sense that "man -k move" throws up a lot of commands to do with moving, but mv doesn't happen to be among them. (See *Fixing the man entry...*, below.)

I'm also confused about what the various directories in the root contain, such as which has the operating system located in it.

The operating system file itself isn't very interesting. It will be called something like vmlinux and can often be found in /boot or directly under /.

The naming of the other standard directories is something I've covered in the column in the past. You might want to take a look at the Linux System Administator's Guide at sunsite.unc.edu/LDP/LDP/sag/node1.html and read the Overview of the Directory Tree you find there.

Fixing the man entry and refining hits

The way to fix the aforementioned man problem is by editing

```
/usr/man/man1/mv.1
```

(you'll need to be root), changing "mv - rename files" under the NAME heading to read "mv - rename or move files", and then running

```
/usr/sbin/makewhatis
```

which recreates the database that man -k works from.

Having done that, or on a system where mv shows up in response to man -k move, the mv entry will appear in the output buried in a lot of other dross you don't need to know about. Old Unix hands are used to this, and know there's an easy way to do an intersection between two key words in the whatis database.

The whatis search system is very unsophisticated, but you can apply external Unix magic by making use of grep (see — you guessed it — man grep) to do the following:

```
man -k move | grep file
```

This filters the man -k output to include only lines that have the word "file" in them. On my system, this gives just a single screenful of output and it's easy to see mv in there. With most GNU utilities like mv, you can type "mv —help" to get a quick screenful of stuff you can do with mv.

Mozilla meets Tux

The version of Netscape Communicator released as source code earlier this year is known as Mozilla. Tux, in case you didn't know, is the name of the patient penguin who sits in as a mascot for Linux on web sites around the world.

Marc Andreesen, the brains behind Netscape, thinks that Mozilla and Tux are a potentially unbeatable combination. "Everywhere I go," says Andreesen, "I find myself sitting across a table from someone who uses Windows at work and Linux at home." Me too, and so do you, as your emails to this column confirm.

The downside for newcomers to Linux seems to be the relative lack of applications. I've never seen this point myself, although it often crops up in my emails. For me, Windows is like a small flat stuffed with sofas and not much room to move. Powering-up Unix puts me in mind of a French chateau — draughty, a little ramshackle, but full of treasures and with loads of space to explore.

Well, if it's comfy sofas for Unix you're after, there are now several of these around. I've talked about the Gimp (www.gimp.org). Recently joining this magnificent graphics package is Moonlight (Fig 2, p272), a 3D visualisation package you can find at www.cybersociety.com/moonlight.

One application I would like to see under Unix is something in the continuous voice recognition department. For fun, I've dictated this month's whole column into Dragon's wonderful NaturallySpeaking. Alas, the product only runs on Windows, although John Bridle, joint MD of Dragon UK, tells me his people use Linux extensively in their development of the core recognition engine. What did you expect...?

PCW Contact

Email Chris Bidmead at unix@pcw.co.uk

Fixes, updates, Warp and all

Terence Green has a fix for everything this month: fixes for Netscape, updates for Java, Epson drivers, support for TWAIN drives and more. It's a one-stop shop for all Warp customers.

Kicking off, some additional information regarding Warp 4 FixPak #6, Netscape for OS/2 and the OS/2 Java 1.1.4 kit from last month's cover CD.

The Netscape version is the Level 7 update which fixes problems identified in earlier 1998 updates. The secret way to identify Netscape for OS/2 versions is the NETSCAPE.PKG file which can only be seen after you extract the files from the package. Doh!

I didn't include any of the updates for Java 1.1.4 on the cover CD. This started off as an omission on my part, but I've since been advised it was a smart move. Smaller fixes appear regularly, but as the cover CD will always be a few months behind due to publishing schedules, it is best to get updates direct from IBM Hursley at ftp.hursley.ibm.com/pub/java/fixes/os2/ or via the Hursley Java web pages.

This month's cover CD features Warp 3 FixPak #35. Please read the FixPak instructions in the various readme files carefully before plunging in. If you have a Cyrix 6x86-class CPU, *do not* install FixPak #35 as lockups have been reported. At the time of writing the situation is unclear and other Cyrix CPUs may be affected. Check online sources for up-to-date information.

Communicate and fortify

Coming back to Netscape, IBM says Communicator for OS/2 will be ready in October as a free download from IBM Software Choice. I found this information at the OS/2 WARP FM site at www.software.ibm.com/os/warp/warpfm.

WarpFM also says Fortify for Netscape, version 1.2.1 for OS/2, is now available. I've been using the Windows NT version of this Australian 128-bit encryption package with no untoward results. It enables the strong encryption that is disabled in versions of Netscape downloaded outside of North America. Visit the Fortify web site at www.fortify.net/ for more details.

WarpFM also says it is time to upgrade to Warp 4, since OS/2 version 2.11 and earlier will not be certified for Y2K compliance. Warp3 can be made Y2K compliant with FixPak #32 and above, Warp 4 with FP #5 or higher.

Hard times

Gordon Gay wrote with a problem affecting a 4.3Gb SCSI hard disk that returned odd information on the size of partitions under Win-OS/2. I couldn't be sure of the exact problem because he fixed it by downsizing the partition with PartitionMagic.

Two issues arise. One is that PartitionMagic is an absolute beauty. The other is that post-FixPak #6 there were a number of comments on the OS/2 newsgroups about Adaptec SCSI adaptors.

Adaptec adapters can enable sector translation for drives over 1Gb. They do this by default. Since FixPak6 switches this on, if your adapter has translation set off, a problem could arise.

Check by pressing CTRL-A when the Adaptec BIOS message appears at boot time. Please *do not* change this BIOS setting unless you have a current backup and are prepared to FDISK and reformat your drive.

The quickest way to update support for large E-IDE or SCSI drives or removable drives is to download a fix from IBM Device Driver Online at service.software.ibm.com/os2ddpak/html/. Alternatively, install FixPak #6 for Warp 4 or #35 for Warp 3. The new removeable drive support covers LS-120 and ZIP ATAPI drives, and also EIDE hard drives greater than 4.3Gb. A fix for drives larger than 8Mb which didn't make it into the FixPaks should be on the Device Driver Online site by the time you read this.

John Buckley writes to say that he considered a Zip Plus drive but decided to go for a Syquest drive. He chose the EzFlyer 230Mb because it is more than double the size of a Zip Plus for £30 less, access time is

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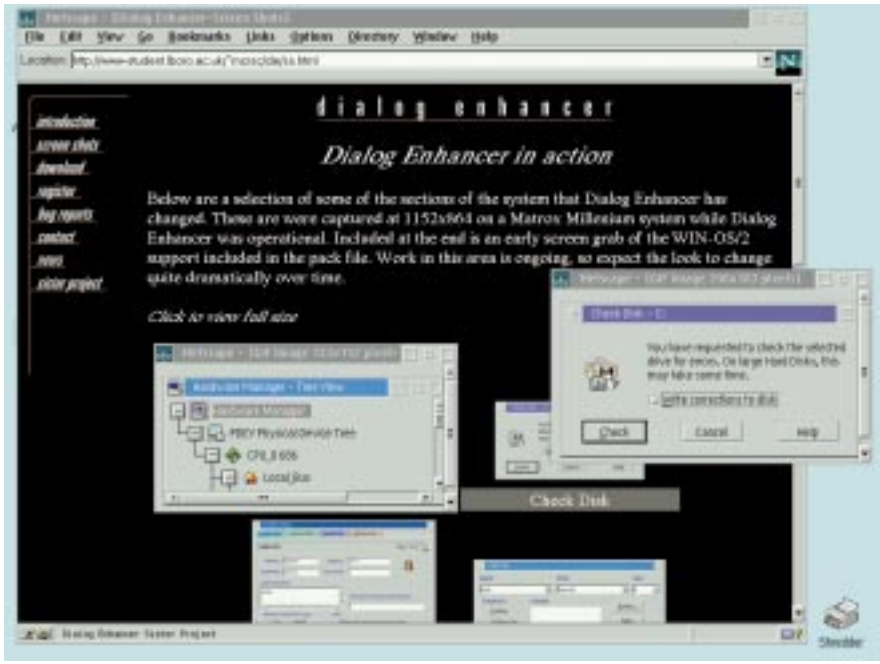
Easter eggs and global news

Erkki from Finland has finally discovered the Warp 4 Easter Egg. Search for AAAAA.EXE and run it to see a scrolling list of developers with a background appropriate to Texas where the OS/2 team is now based. AAAAA.EXE works in Warp 3 too.

Stephen Brereton writes to say he won a copy of OS2 Warp version 3 (3.5 disc version). I'll pass Stephen the email address of the first reader to send me an email requesting it.

The Global English version of Lotus SmartSuite for OS/2 Warp 4 started shipping Thursday, 26th March. The German, Global French and Danish editions follow mid-April, and Global Spanish, Brazilian Portuguese, Italian and Dutch editions in June. The Release Notes are available from the Downloads page of the SmartSuite for OS/2 Warp 4 web site at www.lotus.com/smartsuiteos2.



Above Beautify Warp 4 with Dialog Enhancer from www-student.lboro.ac.uk/~mcrsc/ostrans.html

Left Fortify Netscape for OS/2 with 128-bit strong encryption from www.fortify.net

as good if not better for the parallel port version, and "they are quite clear on the web that they *do* support OS/2".

Drivers on site

John McLeod searched the Epson Germany site in vain for the Epson Stylus 600 driver mentioned in a previous column. So did I, until I discovered that Epson Germany has put it up on the LEO site at www.leo.org/pub/comp/os/os2/leo/drivers/printer/epson1011.zip. The description says: "10 Feb 98, 4893759 bytes; Epson (color) OS/2 printer driver". And the LEO site is very neat because you can browse to the files and read the readme online to see if it meets your needs.

Alternatively, IBM has a new OMNI driver at Device Driver Online which is said to handle text well and colour passably well at lower resolutions but not at 720 x 720. And there is a new parallel port device driver, PAR1284.SYS, at Device Driver Online too. It needs a PC with BIOS support for bi-directional or Enhanced Capabilities (ECP) printing.

John is also looking for scanner support. BMT Micro has a CFM TWAIN driver pack. Check www.bmtmicro.com for a list of supported scanners and a demo download. The CFM TWAIN driver supports SCSI scanner adapter boards and ASPI-compatible SCSI host adapters. It can be ordered online, cost $50.

Richard Castle, of Loughborough University, wrote to tell us about his Dialog Enhancer program for Warp 4.0. Have a look at the screenshot above to see how it improves many of the dialog boxes. More information at www-student.lboro.ac.uk/~mcrsc/ostrans.html.

PCW Contact

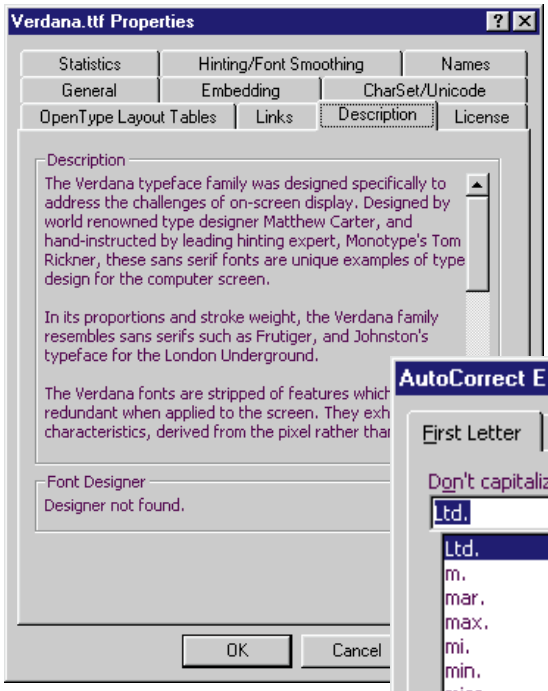
Terence Green can be contacted by post via the usual PCW address (p10) or by email at os2@pcw.co.uk

Capital gains

Automatic capitalisation? Autocorrection of doubles? For some users it just doesn't make Intellisense. Tim Nott shows you an unusual and easy way around it, with an added bonus.

Readers James Roberts-Thompson and John Gray have both rapped my knuckles over giving the American URL for the Microsoft web site. All the free font stuff is also available from the European mirror site at www.eu.microsoft.com/typography/free.htm and you'll probably be able to get at it much more quickly .

The latest treat I've downloaded is the Font Properties extension. This tells you everything you could possibly want to know about a font: such as whether it can be embedded in a document, what languages are supported and how many glyphs are included. Some fonts have a paragraph of description (Fig 1) and even links to web sites: these two items aren't embedded in the font file but are actually from a mini-database inside the extension .DLL, so presumably you'd need to update the latter regularly.



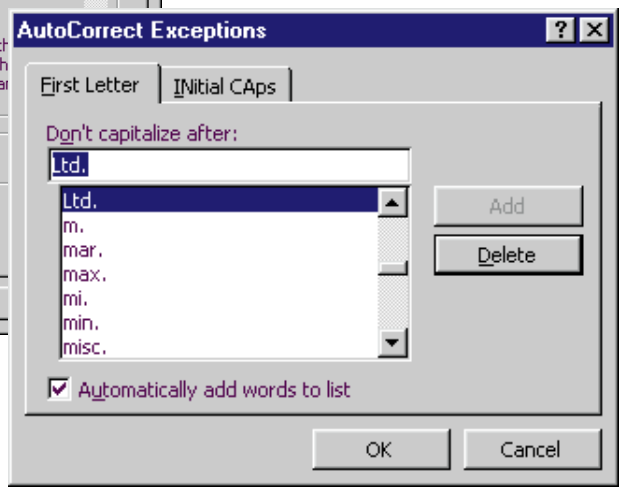


Fig 1 (above) All you wanted to know about Verdana

Fig 2 (right) Keeping IntelliSense sensible with the exceptions list

A rule for the exception

I've always had something of a love-hate relationship with Microsoft's Intellisense. Being heavy-handed on the shift key, I appreciate the correction of two initial capitals. But there are times you *want* two capitals: if, say, you write about PCs or MPs or Quark XPress. It used to drive me mad when it first came out in Word 6, but Word 7 and 97 are much better.

Similarly, the automatic capitalisation of sentences is fine unless you use full stops after terms like Ltd., or any other common business abbreviations. You can undo an autocorrection with an Alt + Backspace, or Control + Z, but there's a better way: if you click the Exceptions button in Tools, AutoCorrect, AutoCorrect, you'll see lists of exceptions for both categories. You can add to and remove from these (Fig 2). The clever bit is that if you backspace and manually correct an erroneous capitalisation or uncapitalisation, rather than just undo it as described above, it will get added to the exceptions list automatically.

AOTM (acronym of the month)

This month, I've been looking at acronyms used in personal online conversations or newsgroup announcements. Most are fairly international, such as **ISTR** (I seem to remember) or **ROFL** (rolls on floor laughing) but I think I've found a genuinely British example. When someone posted, for the umpteenth time, a variant on the bogus virus scare DO NOT READ ANY MAIL MESSAGE WITH "WIN A HOLIDAY" IN THE TITLE… another person commented that this was a **DG**.

Director General? Deo Gratia? No, what they meant was a Dead Granny. This wonderfully macabre expression means a modern myth — typically one of those "True… it happened to a friend of mine…" stories. It originates with the tale of the family who took Granny on holiday to Spain in their car. The granny passed away in the night and by morning rigor mortis had set in. So they wrapped her in blankets and tied her to the roof rack. They stopped for lunch, and when they came out of the restaurant, the car had been stolen. And I know that's a true story because it happened to this bloke in my local pub!

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Questions & Answers

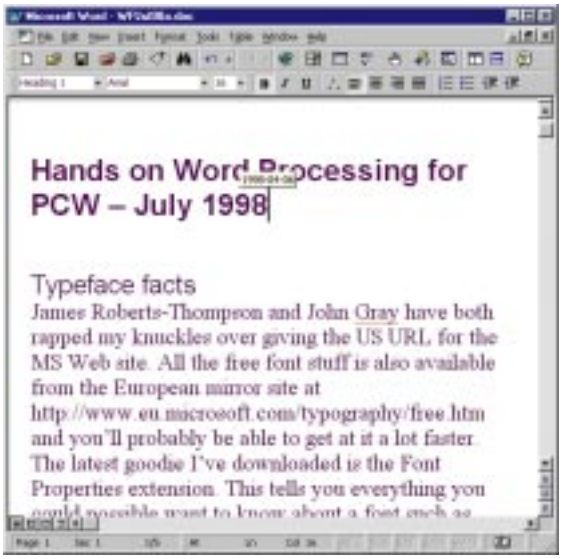


Fig 3 **Autocomplete? Just say no**

Q How can I stop Word 97 popping up a little yellow box offering to follow 1998 with the current month, then day? If I press return, as one normally does at the end of a heading such as "Report for May 1998", it puts these figures in… Aaaargh!

Jill Beswick

A Go to Tools, AutoCorrect, AutoText and untick the box labelled "Show AutoComplete tip…" This means you'll have to activate your real AutoText entries by pressing F3, but having suffered with this myself when putting the month and year at the top of this column (Fig 3), I think it's a small price to pay.

Q Reading through *PCW*, I saw the font listing macro. I typed it out and it works perfectly. All I want now is a font list that is in alphabetical order.

GK Law

A The original macro was admittedly quick and dirty, so let's keep it that way. First, you need to modify the macro slightly. Replace the line that reads

```
.TypeText Text:=FontNames(n) &
vbCr
```

with

```
.TypeText Text:=FontNames(n) &
vbTab
```

Then run the macro. Then go to Table, Sort… (you don't have to create a table first) and, bingo!

By the way, there was a slight mistake in that macro but only one person has fallen foul of it. Two lines end in an underscore — there should be spaces before the underscores. All these do is to inform VBA that the program line continues on the next written line, so alternatively you can leave out both the underscore and the carriage return following it.

Q What accidental key combination in the bottom left-hand corner of a Windows Keyboard causes Word 7.0a to close without confirmation and without saving the open documents? Mine is a Word 7 installation with no macros nor customisation. I cannot reproduce the effect deliberately, but it has happened at least a dozen times by accident! How can I stop it?

Tony Cattermole

A You've got me there, Tony. Or perhaps someone has got you, as I know of no standard Word command that will do this. There are, however, ways of doing this with a macro: the simple statement FileExit 2 will close word without saving or prompting. Double check the content of Tools, Macro… for all your templates. The other possibility is that something is causing Word to crash.

Q I was able to print labels with graphics in Word 7 by selecting the graphic, clicking on Tools, Labels, New Document, and there they were. When I try the same procedure in Word 97 the labels appear blank. Why is this happening and how I can print my labels with graphics in Word 97?

Michael Thompson

A It seems that this feature has been "improved" so that selected graphics are no longer automatically incorporated into a label. But you can still import or paste graphics having created the blank label, just as with any other document.

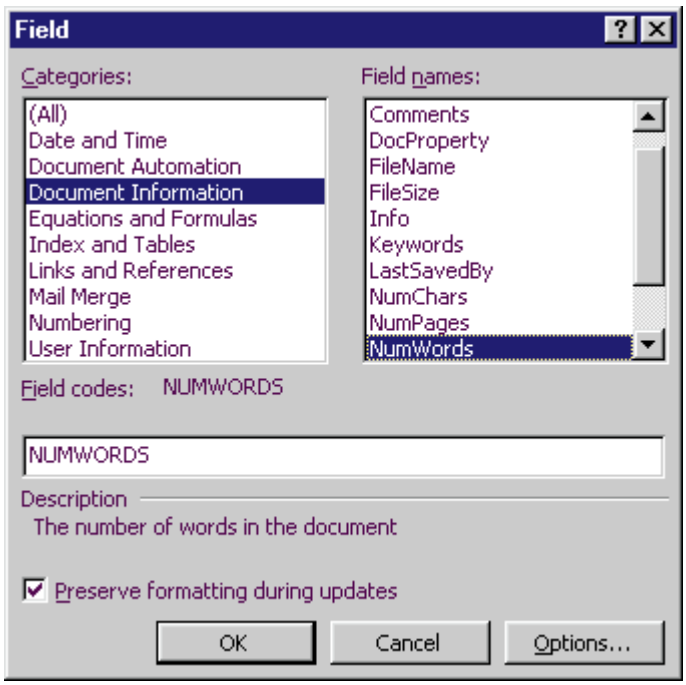


Fig 4 **Insert an instant word count**

Q I'm using Word 97 and I would like to paste the findings of word count directly to the last line of the document I'm checking without having to type anything out. Is this possible? Could it be done with a macro?

Robert Phipps

A The easiest way is with a field: Insert, Field, Document Information, NumWords (Fig 4). For instant gratification, record this as a macro and add it to a toolbar.

Q Welsh needs 28 accented vowels: the seven vowels "a e i o u w y", each with grave, acute, circumflex and dieresis. Some of them rarely appear in words (e.g. w with dieresis ¨), but any of

Questions & Answers (cont'd)

them can occur in both upper and lower case. And Welsh spellcheckers assume that we will "have configured our word processor accordingly". I know that â is obtained in MS Word with Control + ^ and then the letter, but this does not work with W and Y.

Duncan Stewart

A Good news and bad news. First you need Word 97 and need to be typing in one of the standard Windows fonts, or one of the other Unicode fonts available from the MS web site or with Office 97.

Go to Insert, Symbol, choosing normal text as the font. Scrolling through the available characters should reveal some, but not all, of the missing ones including Y and W circumflex tucked away in the Latin Extended-A section. Once you've tracked these down you can assign keystroke shortcuts, including "dead" keys, so Control + ^ w can be set to produce w-circumflex, for example.

With regard to the Welsh spellcheckers, it depends if and how they recognise Unicode characters.

Q I have a lot of work on an ancient Amstrad PCW8512 with two 3in floppy drives. Is there any way of getting them onto a PC? The PCW is, unfortunately, dead. However, I do have a copy of Locoscript for DOS if it is useful for retrieving the files.

Chris Hegarty

A If you can get hold of a live PCW that has a serial port, you can transfer the files over a serial cable to a PC using the comms software that's tucked away on one of the PCW system discs. A more elegant approach is to buy a cable/software bundle from the Locoscript folks. Without a live PCW, your best bet is a firm which will convert disks to a PC-readable format (try Softco on 01306 740606).

Q How can I stop Word (and Excel) interpreting (c) as the copyright character ©? It's annoying in lists that go (a), (b), (c); the only way round it is to stick a space inside the brackets.

John Callaghan

A It's an AutoCorrect thing. You can undo it with Alt + Backspace on a one-off basis. But since you obviously need (c) more frequently than the copyright character, why not got to Tools, AutoCorrect, AutoCorrect and delete the entry (Fig 5)?

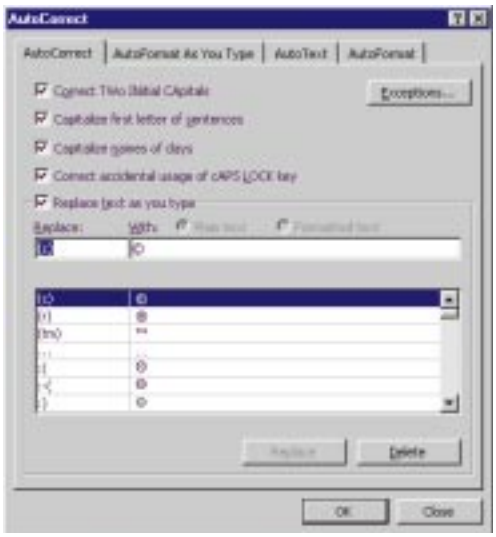


Fig 5 Delete gets rid of uninvited copyright symbols

Mini macro

Tim Ball took the 13-line Word file list macro from February's column and polished it up into something very smart, with a custom dialog box for entering the folder path and filespec, together with options for searching sub-folders and looking for text strings.

The strange thing, though, was that if the user cancelled the dialog it would list the contents of C:\Windows. I won't go into the details of the macro as it's too long for the column inches available, but I hope to include it on next month's *PCW* CD-ROM.

However, this brings up a very important point of WordBasic programming etiquette. If you create a dialog box that includes a Cancel button, make sure you give that button something to do such as: go to the end of the macro and perhaps display a suitable message. If you don't, then the result of pressing the Cancel button will be unpredictable to put it mildly.

In this case, Tim Ball had started well with an OnError Goto errorhandler at the beginning of the macro and the label (errorhandler) at the end. Having set up his dialog box, he ran it with the following statement:

```
x  = Dialog(dlg,1)
```

This function not only calls up the dialog onto the screen but also, as you might imagine, returns a value for x. This depends on the button clicked and it makes for more understandable programming to call this, say, "ButtonPressed" instead of x. In this particular case, if the Cancel button was pressed, a value of zero was returned. So appending the line

```
If x = 0 Then Goto errorhandler
```

made a tidy job of cancelling the macro.

Let your shortcuts do the climbing

Here's a handy tip from Storm Dunlop. It's really a general Windows tip but since Windows gets all the best tips anyway, and it's particularly relevant to WP documents stored in hierarchical folders, here goes.

To save climbing up and down the tree, create shortcuts to often-used but deeply-nested folders in the default Save/Open folder. You can do this in Explorer or in the standard Windows Save/Open dialog by right-clicking and choosing New, Shortcut. You'll need to type in the path, just this once, into the New Shortcut dialog, and if it contains spaces or long folder names enclose the whole thing in quotes. I can now get my hands on both of my *Hands On* columns, straight from three levels up, which saves me a few clicks each month.

A related tip is that if your word processor doesn't have the facility to specify a default folder for opening and saving, you can get around this by specifying it in the "Start in" field of the shortcut properties. Windows 3.1 users can pull a similar trick with the Icon properties (Alt + Enter) in Program Manager.

Out to tender

Here's one I couldn't solve and neither could the members of a Lotus user group that I consulted. Mark and Lynn Johnson found that whenever they tried to add a word to the user dictionary in WordPro, the file had been set as Read-only. The only work-around seems to be to deselect the Read-only attribute from the file (in Explorer) each time WordPro is started. Have any Lotus-beaters out there cracked this one?

PCW Contact

You can contact Tim Nott by post via the usual *PCW* address (p10) or at wp@pcw.co.uk

Scroll playing

Thanks to an alert reader, Stephen Wells presents a method by which you can scroll two windows together. There's listing and sorting help, and formulas to make calculating a cinch.

I wrote in my April issue column about the option to synchronise or not synchronise the scrolling of panes in Lotus 123 97, mentioning that in Excel 97 panes always scroll together. Neither spreadsheet lets you scroll two windows together (each with a different worksheet).

I have since received a letter from Hugh Coombe of Bristol: "*About a year ago, I upgraded from a DOS machine running Lotus 123 Release 2.3 which allows the creation of extra windows with either synchronous or non-synchronous scrolling, vertically or horizontally.*

"*I had been using this facility for some time to run a spreadsheet (in which the titles and margins were locked) with vertical scrolling of the data but allowing it to be split again and the two sets of data to be synchronised in vertical scrolling. This enabled weekly results to be compared with quarterly totals. I wanted to upgrade the Lotus sheets into Excel 97, so I used the data import facility in Excel 97 and imported the already-split sheets.*

"*I was pleased to find that the new Excel sheets preserved these synchronising features. The sheets have the same file name as each other except they bear an additional code after the extension to show the copy number and a marker in parenthesis e.g. filename.xls (VSynch) and filename.xls:2 (Vsynch). However, I have not been able to create the same effect with Excel 97 and, despite much reading, have never found any mention of this facility in Excel 97 Help files or books.*"

I'm grateful to Hugh for taking the trouble to share this with us and would like to point out that I welcome similar discoveries from other readers. I myself have found that some Lotus 123 functions not listed in Excel will nonetheless work if entered in Excel.

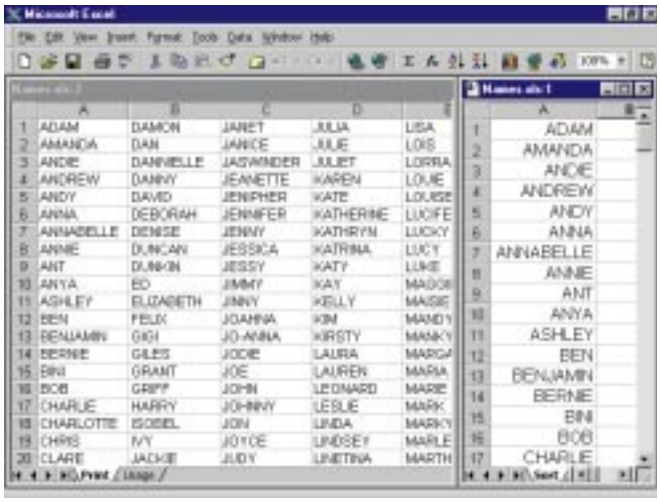


Fig 1 (left) You can sort a multi-column range of names in Excel simply by linking them in the sort column to positions on the print sheet

Fig 2 (below) Some examples of the many "Link to the Web" links which are added in Excel 97 Help files by the update provided on this month's *PCW* CD

It's all sorted

A few months ago, someone wrote in with an interesting Excel alphabetical sorting problem. It seemed simple enough. The reader had a sheet of 200 names arranged in ten columns and 20 rows. He had them set up that way so he could print them onto one sheet of paper and cut them out to put in a hat for an office raffle.

Ignoring my own simple rule of never using an unnecessary macro, I asked for help from a long-time valued contributor to this column. He wrote two completely different macros for sorting multi-column ranges and I am most grateful to him. Regrettably, through no fault of his, I'm sure, I could get neither of them to work and nothing goes in this column without my 100 percent, money-back personal guarantee.

Then it occurred to me how to do it. You enter your 200 names down one column (say column A) of one worksheet. We'll call this the Sort sheet. Then open another, called the Print sheet, and in cell A1 enter

```
=Sort!A1
```

Drag this down to cell A20. In cell B1 enter

```
=Sort!A21
```

and drag this down to B20. Carry on doing this and cell J1 will have =Sort!A181 and cell J20 will have =Sort!A200.

Now arrange the print setup so the range A1 to J20 of the Print sheet is centred on a landscape-orientated page and prints without gridlines. Anytime you want to change the names you do it only in column A of the Sort page. To sort them, click column letter A on the Sort sheet, then

Book review

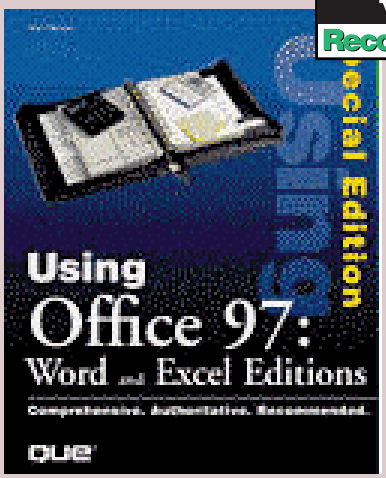
Using Office 97: Word and Excel Editions (Special Edition)

You might assume that a book which covers two applications would cover neither very well. But not a bit of it. This 1,280-pager weighing over 2Kg, is an encyclopaedic source for all the far corners of Excel 97. It makes sense to cover this and Word 97 in the same book because they are frequently used together; sharing address books, graphics, lists and tables. Anyone producing and distributing a report, for instance, is likely to need a combined document. I wouldn't recommend this book for a spreadsheet beginner but if you want an in-depth reference book for advanced features of Excel, like PivotTables, filtering databases, mail merges and mass mailings, and using the Analysis ToolPak for analysing data, then this is it.

There's an up-to-date section on using Excel for creating web pages, including publishing charts and data, and lots of trouble-shooting tips. And if you've never understood the difference between controls in a worksheet and those in a dialog box, you'll find all the answers here. There are not only explanations of when and how to use option buttons, scroll bars, spinners and list boxes, but the author shows you how to dim or blank controls and how to control recalculation.

You can save yourself a lot of macro-writing if you use Excel's automatic sub-totalling features correctly on filtered or unfiltered data. You can brighten up your reports if you understand all the possibilities for using pictures within charts and what is happening when Excel creates a geographic map.

If you've never used Excel's goal-seeking features, nor edited the standard functions, nor taken advantage of array formulas, you'll find this book invaluable.



Personal Computer World Recommended

Heaven knows why a product's features have to be explained by independent training service people, like the several authors of this book. After Excel 4, Microsoft continued to improve its product yet offered less explanation. You can acquire this information in a well-written, well-illustrated form.

Price £36.99
ISBN 0789715554
Contact Computer Manuals 0121 706 6000
www.computer-manuals.co.uk

choose Data, Sort, Ascending, OK.

The Print sheet is shown on the left in Fig 1; the Sort page on the right. This simple workbook is on our cover-mounted CD-ROM this month. Use Names5.xls if you have Excel 5 or Excel95. Use Names97.xls if you have Excel 97.

When help is easy to find

If you can't find what you're looking for in the Excel 97 Help file, the next logical place to check is the Microsoft Knowledge Base. But wouldn't it be useful if you could go straight from the topic in the Help file to the relevant article in the Knowledge Base? Well now you can, as they say in the ads.

Also on our cover-mounted CD-ROM, in The Hands On Spreadsheets Software section, there is a file named xl9701hlp.exe. To install it, close Excel 97 and click on this file. It will automatically unpack and put links into your regular Excel 97 Help files (see Fig 2). Assuming you have a browser and a modem, you can click on those links and theoretically you'll arrive at the right part of the Knowledge Base.

If you should ever wish to uninstall this feature, find and delete the following files from your hard disk: xlmain8.gid, xlnew8.gid and xl9701.hlp.

Listing position

Bob W. Mauk writes: "*We are updating our network. On our old version we have a computer running Excel 5.0 under Win 3.1 and we are using many custom lists in this program. On our new network, we are running Excel 97 under Win95. We can transfer the macros OK, but we cannot transfer the Custom Lists as we can't find what file they are in.*

"*The spreadsheet contains rows, by part number, which we use to make charts. To sort the imported data we use the custom lists which have been entered manually over the years. We could take a spreadsheet on the old system, enter the part numbers in a column from a database, then enter the custom list for each part number (which is time-consuming and error prone), save this file to a floppy, put the floppy in the new system and do the reverse (again, time-consuming and fraught with errors). There must be a better way. Where are the Custom Lists stored? And how can we transfer them to the new system?*"

As I never personally use Custom Lists, I assumed that Bob was talking about the AutoCorrect feature and told him that those entries are stored in the user.acl and Mso97.acl files stored in the C:\Windows directory. By return, Bob explained he meant those under Tools, Options, Custom Lists. So, I entered an unusual word in the Custom List option and looked for it with an Advanced text search on all hard drive files and also (after restarting) in the Registry — no joy. I tried asking the Microsoft Knowledge Base — ditto. Reporting this to him, I asked him to let me know when he found a solution from an informed source.

Much later, I heard back from him and he attached a copy of a brand-new entry in the Knowledge Base. This explains that there is, indeed, no simple way to share a Custom List in Excel 97. But it does clarify that Excel 5 stores them in the file, Excel.xlb. In Excel 7 (Excel 95) they are

EXCELlent little formulas

If you paid A last year for an item, and you paid B this year, calculate the percentage price increase with

```
=(B-A)/A%
```

If you want to find the numbers of the days remaining in the year from 19th July, format the cell General and enter

```
="31/12/98"-"19/7/98"
```

If you want a large amount to display in a narrow column and *not* produce the usual #### error signs, use the TEXT function. If you have £5,000,000 entered in cell G1 and you want to display it in column A, set with a small column width, then enter in A1

```
=TEXT(G1,"£#,##0")
```

This will also display £5,000,000 but run over into column B. You will still be able to treat it as a number entering, say,

```
=A1/365
```

in another cell.

p282 ➢

Questions & Answers

Q If I copy an A4-sized form onto a new sheet, the column widths are not transferred. All other formats are. If I then set the column widths manually, the text does not fit the column width in the same way as on the original sheet. This is despite the font being the same size and type, and the column height and printer setup being the same. This is true of Excel 4 and Excel 97. Given this fact, it is unlikely to be a bug but a "feature". So what is the feature?

A They don't use A4 much in the US. They use good old inches and traditional paper sizes, which is also why all the templates Microsoft provides are set by default for 11 x 8.5in paper. If you fiddle with all the options manually and get your report in an acceptable form, then save this as a template and paste your new data into it, you'll be OK.

To make the column width fit the contents automatically, double-click the boundary to the right of the column heading. The advantage of not transferring column widths is that data imported into a template won't mess it up.

You might also like to check the default on your printer via Control Panel, Printer, Properties, and make sure it is set to A4.

Q I cannot find a way of formatting text as small caps in EXCEL 95. Can it be done?

A The only way I know of is to paste your worksheet into Word, and reformat there.

Q Could you start a movement to bring back full support for EXCEL 4 macros?

In my opinion they are far more user-friendly and quicker to create than VBA, and should therefore be continued. I know Excel 97 will run existing versions but you can't write new ones, which is a big failing.

A I am not much of a one for perpetuating the past, but you *can* write Excel 4 macros if you want to.

Do not choose File, New, Workbook — instead, right-click on a sheet tab and choose Insert, Excel 4 macro. Then, on this new sheet, you can carry on as in days of old.

Q Why does my Excel 97 file take so long to load?

A Things can be speeded up if a preview of the document or workbook is not shown.

Look under File, Properties and make sure that the Save Picture Preview box is unchecked. If you have imported clipart, it's possible that it's not in the most efficient format. Cut and paste a graphic object from your worksheet into an application like Paint Shop Pro — you will find this utility on the *PCW* cover-mounted CD-ROM. Save in a compressed format and then import this new file. In this way, workbook sizes can be reduced dramatically.

Also, have as few applications as possible running at once. And do not have fancy wallpaper running on your desktop.

Q I recently discovered a template at the Office Developer Forum web site for running bulk mailings. I now find I do not have one of the two necessary system files. The file in question is COMDLG.OCX.

A This is a common dialog OLE library file. Maybe it has been omitted to ensure that you register your download? You are likely to have COMDLG16.OCX in your C:\Windows\System directory but you probably need the 32-bit version from a source such as support.microsoft.com/support/downloads/.

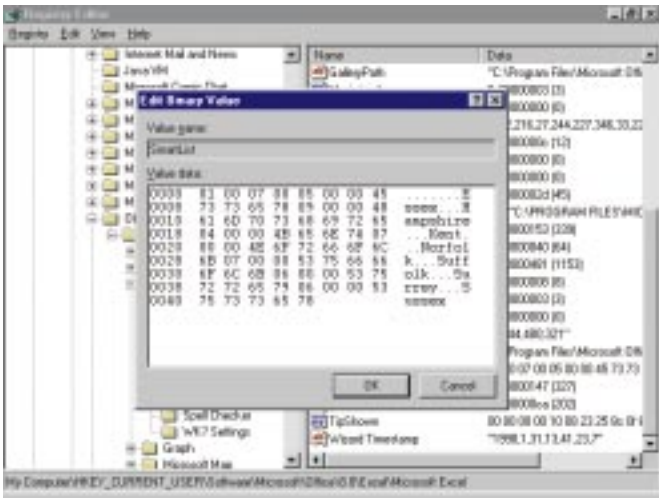


Fig 3 In Excel 97, Custom Lists are stored in binary form in the SmartList key of the registry, with a translation on the side

found in the file <username>.xlb. In Excel 97 they are stored in the registry, and unhelpfully called, SmartList.

Goodness knows, Microsoft means well. Its idea is that odds and ends which used to be spread around in configuration settings (.ini), and other files, should all be brought together in the registry. This would be a good idea if the registry were not so frightening to dabble in.

As a test, I entered some English counties under Tools, Options, Custom Lists, closed Excel and then looked for them in the registry. They are stored in binary form but there is a text translation down the side (Fig 3). Double-click on the SmartList key in HKEY_CURRENT_USER\Software\Microsoft\Office\8.0\Excel\

Microsoft Excel. Exporting this data and importing it into another registry is explained in the Knowledge Base article. To reach it via Excel, choose Help, Microsoft on the Web, FAQ. When the page appears, choose Search from the options, choose Excel in the list box, and enter Q155208 in the search box.

Personally, I think I'd prefer to import data using the facility offered under Excel's Tools, Options, Custom Lists. You could do this straight from the Excel 5 file. The list still becomes available to all Excel workbooks on any platform using that registry. But I want to underline my gratitude to Bob for getting back to me with the answer he was looking for, having found it six weeks later.

PCW Contacts

Stephen Wells welcomes problems or solutions relating to spreadsheets. Write to him at the usual *PCW* address (p10) or email him at spreadsheets@pcw.co.uk

Self-defence class

By popular demand, Mark Whitehorn reviews the requirements for maintaining database security, explaining the components on which most computer-based security systems rely.

I have been asked many times to take a look at the security system that comes with Access, so this month I'll cover the aspects of security which are common to most RDBMSs (but I'll throw in a few passing references to Access). Next month we'll move on to how security is actually implemented in Access.

Most PC-based RDBMSs started life as single-user systems. Some (like Access) offer multi-user capabilities when the tables are accessible over a network. Under these circumstances record locking is automatically applied but security isn't. So the multiple users of your database won't be able to edit the same record simultaneously (which is good) but all of them will have the same unrestricted access to the database; which is generally bad.

Why bad? Well for a start it means that users will be able to add, edit and delete data in any table. Do you really want users to have that power? In addition they will have a (frightening) level of access to the objects (such as forms, queries, reports, code and tables) in the database. So they can change and/or delete those as well. As the designer of the database you may feel that this level of power may be too much in the hands of inexperienced users.

So, you need to restrict what users can do but not all users need to be restricted in the same way. If you design a database that holds information about staff, the company may require you to control access to the salaries information; perhaps making it available only to the company directors and the "bean counters". Or the personnel department may need access to the sales data but not be able to alter that data. You may even be required to give some people access to a summary of parts of the data if the detailed information is sensitive. For example, the bean counters may need to know *how many* employees have a criminal record, but it may be inappropriate for them to know who!

As soon as you need to control access to the data in this way, you will need to apply some sort of security system to the database. Most computer-based security systems rely on the following components:

- Users — the people who use the system, typically identified to the system by a name and password.
- Objects — things in the system. In Access terms, these are tables, forms and queries.
- Rights — the actions that users typically want to perform on an object. For instance, a table has a "Read Data" right and an "Update Data" right. These are granted to users, so if you have been granted the "Read Data" right you can see the data in the table but you need the "Update Data" right in order to be able to change that data. And you need the "Insert Data" right to add more data. (In fact, Access uses the term "Permission" rather than "Right" but it amounts to essentially the same thing).
- Groups — collections of users bundled together. I wrote (above) that rights are granted to users but in fact they are frequently granted to *groups* of users, simply because it is easier to do so. If all the bean counters need "Read Data" access to a table, it is easier to grant it to their *group* (one operation) than individually (there may be hundreds of them).

OK, that's the background which applies to most security systems, so we'll cover how Access works specifically, next month.

Fig 1 — Conversion code

```
Private Sub Materials_KeyPress(KeyAscii As Integer)
' Converts text typed into combo box to upper case
On Error GoTo Err_Trap
  Dim strCharacter As String
  ' Convert ANSI value to character string.
  strCharacter = Chr(KeyAscii)
  ' Convert character to upper case, then to ANSI value.
  KeyAscii = Asc(UCase(strCharacter))
    Exit Sub
Err_Trap:
    strErrorMessage = Err.Description
    DoCmd.OpenForm "frmError_Message"
End Sub
```

Conversion tip

Ken Sheridan (KenSheridan@compuserve.com) writes: "*I emailed you a while ago about forcing input of new terms in two-column combo boxes to uppercase where the bound column is a numeric data type and hidden. You helpfully suggested the Ucase function, which I incorporated in the NotInList event handler. This didn't*

Fig 2 — Return the tax year from a date

```
Public Function FinYear(dDate As Date) As String

   Dim strCurrentYear As String, strStartYear As String, strEndYear As String

  strCurrentYear = Year(dDate)
  If Month(dDate) < 4 Or (Month(dDate) = 4 And Day(dDate) < 5) Then
     strStartYear = Trim(Str(Val(strCurrentYear) - 1))
     strEndYear = Trim(Right(strCurrentYear, 2))
  Else
     strStartYear = Trim(strCurrentYear)
     strEndYear = Trim(Str(Val(Right(strCurrentYear, 2) + 1)))
  End If

    FinYear = strStartYear & "/" & strEndYear

End Function
```

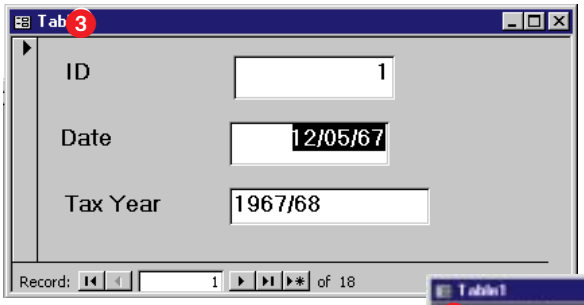
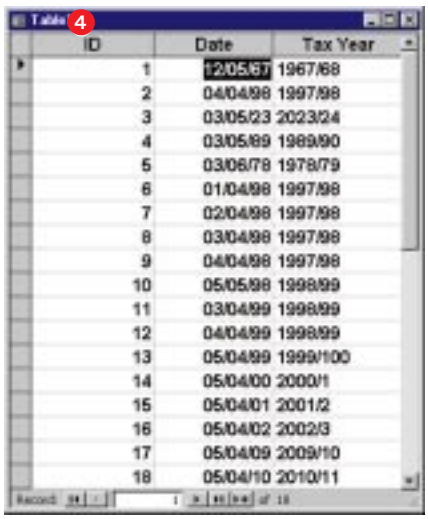
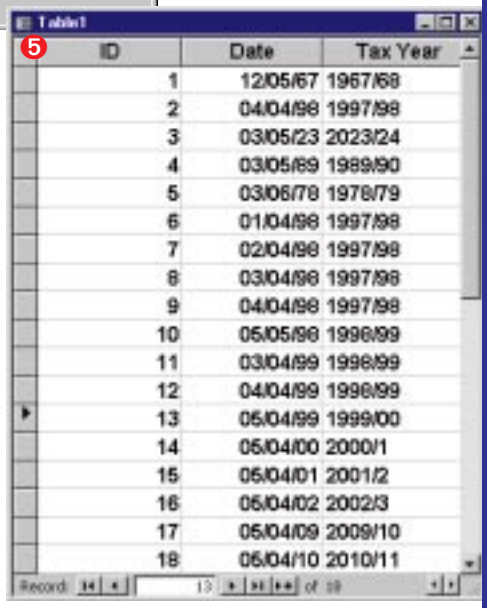


Fig 3 A form showing the use of the TaxYear Function

Fig 4 The same form open in datasheet view, showing the behaviour in the year 2000

Fig 5 Same again but with modified code to give different behaviour for the year 2000





convert the characters as they were typed in. I've now found that the solution was there in the help system all the time. The trick is to use the KeyPress event handler to convert the characters one at a time, as they are typed, and return the converted character to the control. The code is shown in Fig 1. *It also works for memo fields where I had the same problem. Now I have the prospect of wading through all the forms in the database and pasting in the code."*

The code in Fig 1 is for Access 95/97. I've converted it to Access 2.0 and it is on the *PCW* CD in a file called DBCJUL98.MDB.

Getting your dates right

Here's another tip from Ken, shown in Fig 2, which is an Access function to return the tax year from a date. Note the problem with data literals and British date formats (dd/mm/yyyy). Although date literals in SQL have always been interpreted as US format (mm/dd/yyyy), up to version 2 Access accepted them in VBA according to the

international date format in Windows. In versions 7 and 8, VBA interprets them as US format if the date is less than 13th of the month. This could cause problems if upgrading from version 2. Microsoft says it is "standardisation" — others say it's a bug.

This relates to the British tax year, which starts on 5th April. You can pass the date as the function's argument as a date or a string, or as a date literal for US format dates, but avoid date literals with British date formats. Any British date literal before the 13th of the month will be interpreted as US format in version 7 or 8. For the British public administrative financial year, starting on 1st April, just delete from the "If" line:

```
"Or (Month(dDate) = 4 And
 Day(dDate) < 5)"
```

I have put the code into an Access 97 file which is on our *PCW* CD-ROM as TAXYEAR.MDB. In testing, I noticed that this works fine (Fig 3), except for an oddity around the dreaded year 2000 (Fig 4).

This format isn't "wrong" since it is still quite clear to which tax year this date belongs. But if the format offends you, it is easy to add a bit of code to turn it into whatever format you prefer. For example:

```
If strEndYear = "100" Then
strEndYear = "00"
End If
```

will give the result shown in Fig 5.

Questions & Answers

Q I am a newcomer to MS Access and databases. Is it possible to compile an Access database into an executable?

Will Luke
will.luke@fonix.org

A Yes, but you need the Access developer's kit which costs more money. However, it is well worth it if you intend to distribute multiple copies of the same Access application.

Q I am trying to set up a database for order tracking in Access 97. I need a query that selects the last record in the database so I can print only that record as a report. How would I do it?

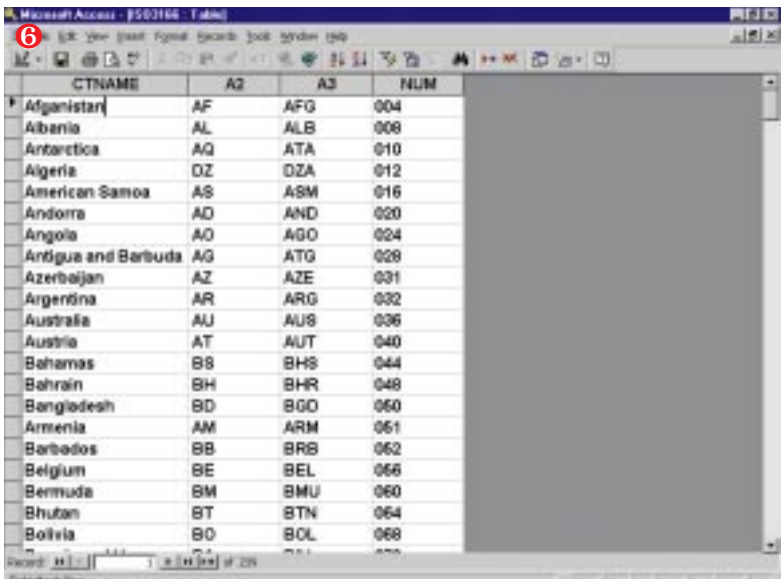
Andrew Lishomwa
alish@zamnet.zm

A What you need to do is base the report on a query which extracts the "last" records from the table. "Last" in this case is presumably the record with the highest order number, so you could use the MAX function. An example of the sort of SQL that might be used for such a query would be:

```
SELECT ORDERS.ID, ORDERS.VALUE, ORDERS.DATE
FROM ORDERS
WHERE ORDERS.ID = (SELECT Max(ORDERS.ID) FROM ORDERS);
```

You can, of course, start playing around with variations on this using "Min", for example, to find the "earliest" record. You do, of course, have to be sure you understand your data well before relying on the fact that the highest value in a field does indeed always indicate the "last" record.

● *I include this information for any other readers who may be interested because, before I could formulate a reply by email, Andrew came back with:* "Apologies. Stupid me! I have solved it with sorted query and top value selection." *This is, of course, an equally valid way of doing it.*



CTNAME	A2	A3	NUM
Afganistan	AF	AFG	004
Albania	AL	ALB	008
Antarctica	AQ	ATA	010
Algeria	DZ	DZA	012
American Samoa	AS	ASM	016
Andorra	AD	AND	020
Angola	AO	AGO	024
Antigua and Barbuda	AG	ATG	028
Azerbaijan	AZ	AZE	031
Argentina	AR	ARG	032
Australia	AU	AUS	036
Austria	AT	AUT	040
Bahamas	BS	BHS	044
Bahrain	BH	BHR	048
Bangladesh	BD	BGD	050
Armenia	AM	ARM	051
Barbados	BB	BRB	052
Belgium	BE	BEL	056
Bermuda	BM	BMU	060
Bhutan	BT	BTN	064
Bolivia	BO	BOL	068

Fig 6 **The format of the ISO country code data**

Waving the flags

If you thought that writing about databases was boring, read the following (considerably shortened) which is a mine of information about (amongst other things) whether you can safely burn the American flag!

Mark Machin writes "*I have something you may be interested in: a (mostly?) complete list of the ISO3166 country codes. I've attached a zipped database in DBF format (yes, FoxPro, I know, but in my humble opinion it knocks Access into a cocked hat for speed!).* (I'll let that one pass for now — MW). *It has the country name, number and both 2- and 3-digit alpha codes. I also have information about country flags if you are interested.*"

markm@wdi.co.uk

I replied asking what an ISO3166 country code is? and Mark came back with: "*I'm not 100% sure but the ISO is, of course, the world's standards body (International Standards Organisation), so I'm assuming that ISO3166 is the document that defines which countries have what abbreviation.*"

The ISO3166 country code files are on our CD-ROM in .DBF format since that can be imported into almost all RDBMSs. You can see what they look like in Fig 6.

PCW Contacts

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column.
Write to him at the usual *PCW* address (p10) or email him at database@pcw.co.uk

Disaster recovery

Roger Gann knows the score: hardware horror always strikes at the most inconvenient moment, like when your VAT return is due. Sit back and gen up on what could be the culprit.

Just like flat tyres never occur on sunny days when you're not in a hurry but at night, in the rain when you're late, so PC hardware disasters always have the knack of cropping up at the most inconvenient moments. Maybe now is a good time to look at the various ways you can dig yourself out of a hole if your PC starts misbehaving. I'll deal with the possible problems peripheral by peripheral.

System unit

By this I really mean the motherboard, as I'll be devoting individual attention to the more important system-unit components later on. Often, the first indication of a problem with the motherboard is a succession of beeps, repeated at regular intervals and the PC refusing to do much else. These beeps are a kind of Morse code and they're trying to tell you something, i.e. where the problem lies.

So, you hear some beeps: let's be charitable and assume it's not something serious. If you're lucky, your motherboard manual will list the beep codes and what they mean. But all too often, the "manual" is silent about these cryptic beeps.

In this case, the first thing I'd do is to remove and reinsert all the expansion boards to ensure a clean, fresh electrical connection between each component. I'd remove any SIMM or DIMM memory and reinstall it, and I'd gently press down on any socketed components on the motherboard that have tried to "creep" out of their sockets.

Some computers also have fuses you should check, especially in the power supply unit, but be wary of simply replacing them — the original fuse blew for a reason and replacement only cures the symptoms.

Loose external connectors are another problem, like the ones at the back of your computer for modems, networks, printers or CD-ROM drives. First, make sure everything is powered off and unplugged to protect the devices themselves. Then, wiggle those connectors, looking for one that seems loose.

Check It out

If you have an intermittent hardware fault you think is motherboard based, then this could be an opportunity to use some diagnostic software such as Touchstone's Check It. Last month, a full working version of Check It 4.0, one of the better PC hardware diagnostic packages, was included on the cover CD-ROM so it might be an idea to install it now and run it, while your PC is still running.

It's also a good idea to prepare a bootable system disk with all the relevant Check It files on it.

Floppy disk drive

Next to power supplies and hard disk low-level formats, floppy drives have the highest failure rate of any PC hardware. The most common message — "General failure reading . . ." — is usually the result of a poor-quality or improperly formatted floppy disk. But sometimes, the problems go deeper than this: it could be the drive that's at fault.

The first thing to do is to take a look at the drive. Open your PC and compare the drive select jumper settings of the problem drive with the drive documentation. Check to see that the data cables and power leads are properly connected at the drive and controller ends. If you see that the ribbon cable is snagged or crimped, it might be wise

Your monitor: how to get a perfect picture

Like the keyboard, the monitor is one of those devices that either works or it doesn't and when it doesn't, you soon get to find out. Make sure that the signal cable is plugged in properly to the VGA port. The pins inside a VGA plug are particularly thin and very easy to bend if you try and insert the plug at an angle. I know of one machine where one pin was so bent, the one carrying the red signal, it made the picture have a blue cast. If you have an odd colour cast, then check out the VGA plug and very (very!) carefully straighten any bent ones. Check that the brightness is turned up, too!

Everybody should get a perfect picture under character-mode DOS but if you boot up and get no picture, just a number of repetitive beeps, it could mean that the PC can't detect any video RAM, i.e. it can't "see" the graphics card. The answer here is to turn the PC off and try removing and re-inserting the video card.

If the image is otherwise OK but breaks up under Windows then you're either using the wrong video drivers or you're using the right video drivers but with the wrong settings. If you have a problem like this, run Windows 95 in Safe Mode. Once you've proved that Windows works in this mode, the next step is to make sure you're using the right video drivers so use the Add New Hardware Control Panel wizard to auto-detect your graphics card.

Sometimes, the refresh rate, the speed at which the image is redrawn from top to bottom, can be set too high for your monitor and this will also cause the picture to break up. Often choosing a lower refresh rate, such as 60Hz, may cure the problem, and this is often done via the screen driver though occasionally, you can adjust it via a small adjusting screw at the back of the display.

to replace it. If your drive fails to recognise a change of floppy, i.e. it thinks disk A is still in the drive even though you've put disk B in, unplugging the ribbon cable and plugging it in again can cure it. Maybe your CMOS setup is wrong: verify that it is properly configured to the drive type and size.

What's the diagnosis, doctor?

If the problems persist once you've determined that your software and hardware are set up correctly, run a diagnostic program, such as NDIAGS or Check It, on both the controller and the drive to rule out the possibility of your controller failing. If no errors are found, format a new, never-before-formatted floppy and try the operation again.

Hard disk

Is the computer refusing to boot up? Maybe you left a non-system floppy in the A drive? Some systems can be set so they won't boot from that drive, but in most cases A will override anything on the hard disk during the boot operation. Remove it, and press any key to continue.

On the other hand, it may be a boot-sector problem. Enter CMOS Setup first and make sure the drive settings (cylinders, heads and sectors) are correct for your hard disk. Some modern BIOSes have an auto-detection feature that interrogates the hard disk to determine its correct settings.

Try booting from a system floppy and see if you can go from there (in fact, that's why the A drive is allowed to override C). You'll need a bootable system floppy for this task, so it pays to have one already prepared. As well as the system stuff, copy useful utilities on to it, things like CHKDSK, SCANDISK, SYS, FORMAT, FDISK and so on. Don't forget that if you have a FAT32 partition and you boot up with a version of DOS that only recognises FAT16 partitions, then you won't be able to see even a healthy disk. Moral of the tale: make a bootable system disk under Windows 95.

Back for good

If you can't log on to the hard disk and you get an "Invalid drive specification" error, then DOS thinks the hard disk isn't partitioned. It might be worth trying to rebuild the master boot record using the undocumented FDISK/MBR command, but it could be time to pay last respects to your data and partition/format your hard disk. Just as well you back up your data regularly.

Replacing the hard drive. It's easier to slide the new drive into one of your PC's forward-facing bays. But installing it inside the case, perhaps under the floppy drive, leaves room for extra devices

Occasionally old hard disks refuse to "spin up" to speed. I've sometimes been able to get a hard disk going by the simple expedient of extracting the drive and giving a sharp twist to spin the platters slightly, and then reinstalling the drive.

System files

If you can log on to the hard disk, Drive C:, from the floppy, and run programs that are on it, then all you've got is a booting problem which is probably curable by using the SYS command to re-transfer the system tracks. SYS C: should do the trick. You should also run SCANDISK to check for any problems with the directory or file structure.

Maybe the hard disk boots fine but hangs halfway through the startup files. With Windows 95 and MS-DOS 6, this is easy to diagnose thanks to the F8 interactive boot feature. Simply press F8 as soon as you see "Windows 95 starting..." and you can step through each line of CONFIG.SYS and AUTOEXEC.BAT, choosing whether to execute it or not. Answer "Yes" until it hangs, note the command line in question, then reboot, press F8, and this time round answer "N" when it comes to the line that hung before.

Once the PC has booted properly, check out the device driver or TSR in question, and, if necessary, recopy it on to the hard disk from its master floppy.

CD-ROM

CD-ROM drives are relatively complex devices and can be upset by relatively trivial faults. Windows 95 doesn't require specific drivers for ATAPI or IDE CD-ROM drives but DOS does, so make sure that the right driver is loaded in your CONFIG.SYS file. The driver names vary from make to make but the line will look something like this:

```
DEVICE=C:\ATAPI.SYS /D:MSCD0000
```

You also need to get DOS to recognise this extra drive, and this is done with the MS-DOS CD-ROM Extension utility, MSCDEX.EXE. It's loaded in AUTOEXEC.BAT, thus:

```
C:\DOS\MSCDEX.EXE /D:MSCD0000
```

I've known a CD-ROM drive to "disappear" from Windows 95 for no explicable reason, and no amount of hardware auto-detection will cause it to resurface. The only cure I've found is to remove/delete the hard disk controller from the Device Manager tree, and rely on Windows 95 to auto-detect it and reinstall it the next time you reboot. This sounds like a brutal solution, but I've never known it to fail!

PCW Contact

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To full effect

In part III of the VST masterclass, Steven Helstrip explains VST's most powerful features — real-time plug-in effects — showing you how to use insert, mixer and master effects.

Year after year, software has made it easier for anyone to create music with their PC. Even in the early eighties we saw the Commodore 64 being used as an eight-track sequencer, drum machine and sampler.

While I and the rest of the Amiga fraternity were making the most of noisy 8-bit recordings, MIDI sequencing was gathering pace on the Atari ST thanks to Pro 12, Cubase and Creator. We now have combined MIDI and audio sequencers, and multimedia has brought about countless music packages. We've come a very long way; you only have to spend a moment tweaking the dials of ReBirth to see that. But I never anticipated the stage at which I could sit a tone-deaf friend in front of a PC and say: "Here, have a go on this while I put the kettle on", only to return to find he'd knocked out a great dance tune. The software to which I'm referring is Dance eJay (see p294).

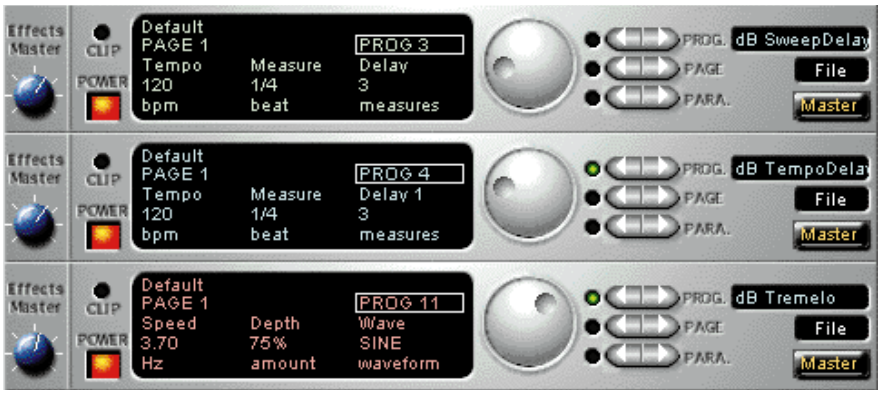

Fig 1 **Dave Brown's plug-in for VST is free on the internet (see p294)**

VST masterclass — part III

Amongst the most powerful features VST has to offer are its real-time plug-in effects. To kick-start your collection, VST ships with a basic range of tools that includes reverbs, delays and choruses. Since VST is entirely software driven, plug-ins rely heavily on resources, unlike sound cards which have dedicated DSPs to calculate effects algorithms. There are three basic types of effect that can be used in VST: insert, mixer and master.

1. An insert is an effect which is literally "inserted" into the signal path of an audio channel and remains dedicated to that channel — four inserts are available on each. The types of effect you would use on an insert would include compressors, noise gates, EQs and those effects where you only want to hear the return of an effect without any "dry" signal.

2. Mixer effects are on the receiving end of virtual auxiliary sends from each channel strip. Four effects can be set up and are available to each audio channel. A signal is sent to a mixer effect using the send dials in the EQ/FX window. Clicking the Pre button enables you to send a signal level independent of the channel's fader position and mute status. The return of the effect is then either sent directly to mix, or to a bus (which we'll deal with later). The most common mixer effects are reverbs and delays, as it's likely they'll be used by more than one audio channel.

3. Master effects are essentially stereo inserts on the master mix, or output. Again, compressors and EQs are likely candidates in addition to stereo enhancers.

Using mixer effects

- Select Effects from the Audio menu to select and turn on the desired effect. Most plug-ins have preset patches which are selected using the program buttons. WunderVerb, for instance, has ten effects algorithms, from large halls to gated reverbs. You can rename presets, or user settings, by double-clicking on the name.
- When routing a channel to an effect, be careful not to overload the effect otherwise clipping or distortion will occur. Bear in mind, also, that you may want to send additional channels to the effect, which will increase the input load.
- If you have a sound card with multiple outputs, or one that is capable of mixing multiple audio channels in hardware (such as the EWS64 XL), it is possible to send the return of the effect to a bus. This bus is a secondary output to mix that enables you to

New Steinberg release

3.551 has been released, which introduces Steinberg's EQ-1 EQ algorithms in the monitor section. At the press of a button, you can now toggle between standard and the new, high-quality EQ which is much cleaner and more precise with up to 24dB gain/attenuation. The driver architecture has also been optimised for better synchronisation of MIDI and audio. 3.551 is available for download from www.steinberg.net

p294 ➢

The electronic DJ

Dance eJay is an electronic DJ, although to regular readers of these pages it's best described as an eight-track sample-based sequencer.

With the techy bit out of the way, what we have here is the "Lego" version of Cubase, and it's suited to kids of all ages! The building blocks, or samples, are colour co-ordinated into various categories (loops, bass riffs, vocals, etc) and fit together in any combination of 1-, 2- or 4-bar loops. And because all the samples are in the same key and tuned to 140bpm, there really is no going wrong. Well, almost. All the loops fit to one of four chord progressions and if you try hard enough, you could layer two chords that don't work particularly well.

The arrange window enables you to drag and drop samples onto one of the eight tracks. Tracks 1-6 are mono, while tracks 7-8 make up a stereo pair. Bar numbers are indicated at the top of the screen and samples automatically lock to the start of the bar. Holding down control allows you to shift sample positions by semi-quavers or sixteenths.

Here's a tune my mate knocked up while I wasn't looking

So what are the samples like? The overall style is definitely Euro and there are some respectable loops and synth riffs on which to lay hands. The vocals are similar in style to 2-Unlimited and, for want of a better analogy, are cheesier than a bag of Wotsits.

As for the raps, well, let's just say they're best avoided altogether. But that still leaves roughly 800 worthwhile samples with which to play around.

A full installation eats its way into 130Mb of hard disk, but that includes the full-complement of 1,350 samples. You can, of course, load up your own samples and export your opus to a wave file so that you can make a CD to send off to Pete Tong! Excellent fun and superb value. (See *Contacts*, below).

Fig 4 **Get spiced up with this valve-like distortion effect plug-in**

assign multiple channels or, in this case, effects, to a stereo fader. You can assign all your effects to the same bus for overall effect control, or to individual buses. These buses are activated in the Master section and assigned to outputs beneath each fader. Once activated, you can route effects to them from each effects rack. Note that activating buses will slow down the performance of VST.

• As the effects start to add up, your system will inevitably grind to a halt. Keep an eye on the performance indicator as this will give you some forewarning. To take the weight off your processor, the export audio option enables you to write a new file with the effects added, including any automation. This can be found in the file menu. The newly-created file will be based on un-muted audio tracks between the left and right locators. The new file will be imported to a new audio track.

Fig 3 **Use the Trancemitter for anything which needs a touch of movement**

Get plugged in to VST on the net

You don't need to spend a fortune on third-party plug-ins for VST; there are literally dozens on the internet, for free. Check out those listed below.

• Dave's plug-ins: www.dbrown.force9.co.uk Dave Brown's plug-ins (Fig 1) consist of a tempo delay, sweeping delay and a tremolo. These delays are straight replacements for VST's delays, only they work out the delay times for you based on the tempo. The tremolo provides two independent modulators for tremolo and pan. Choose from sine, square, triangle and saw modulator waveforms.

• Trancemitter: www.steinberg.net Trancemitter is an LFO-controlled resonant filter that's superb for pads, bass-lines and drum loops. In fact, anything that needs a touch of movement. This one (Fig 3) is courtesy of Steinberg.

• Spice: www.netcologne.de/~nc-rehaagth/tr.htm Here's something to, er, spice up your kick drums and guitar riffs. Spice (Fig 4) is a basic valve-like distortion effect with just two parameters; depth and mix.

Questions & Answers

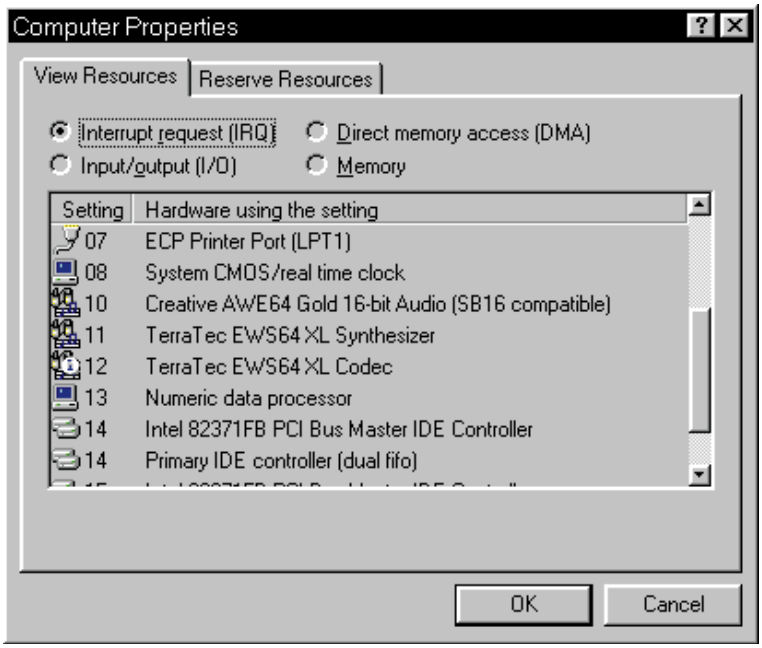

Fig 2 Under System Properties/Device Manager, click on computer to view IRQ usage

Q A friend of mine is blind and makes his living as a semi-pro musician playing keyboards. He bought a PC with an AWE-64 (last December) and uses it with a screen-reader device called HAL95 and navigates Win95 with the keyboard. He has a WinTV card with which he can convert teletext into text files and use Creative's Text Assist to read it. He also relies on a scanner to OCR letters. HAL95 on COM2 has its own speech but it's better when used via Text Assist.

His problems start when he wants to make good-quality recordings. The AWE-64 is positioned next to a modem, which I suspect is creating noise, but there are no free slots to which to move it, so I suggested changing the motherboard.

With his digital recording equipment my friend would like to manipulate sound in the digital domain. We know the AWE-64 has a digital output, but no input. The Maxi Sound Studio Pro has both and would seem to be a good choice. The problem is that he does not want to lose the use of Text Assist which helps him a great deal. Is it possible to have two sound cards in one machine? Can we find enough interrupts and will they conflict?

Ray Bradshaw

A I can't see any problems running two cards in the system you have mentioned, assuming you find a motherboard with more slots. I run an AWE-64 and a Terratec EWS64 XL in my PC, aswell as SCSI and MIDI interfaces. If the modem and TV cards are the only cards using interrupts, there will be ways to overcome any initial conflicts.

First, check your System settings to ascertain how many IRQs are free at the moment (see Fig 2). It's quite possible there will be only one. Depending on the second sound card you choose (check out our group test on page 206), this could well be enough. However, in the event that two IRQs are required, you can set up two hardware profiles in Windows 95: one with the parallel port enabled for use with the scanner, the other with it disabled to leave an IRQ free for sound.

The noise problem is more likely to be a combination of the graphics and TV cards, about which you can do little. However, you can remove some noise by muting the mic or line inputs (whichever is not used) in the sound card's mixer settings. Also, don't apply gain on the treble setting and avoid using 2x and 4x gain on the card's output.

PCW Contacts

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Dance eJay is £24.95 from FastTrack Software Publishing: 01923 495496 www.fasttrack.co.uk

Flash in the plan

When you've seen one poor-quality web image too many and your own scanning sessions don't quite cut the mustard, you need Flashpix, PhotoCD and your local branch of Boots.

Now seems a good time to take a closer look at Kodak's Flashpix file format, which seems to be rapidly gaining favour with developers of image-editing applications.

What prompted my interest in Flashpix was a particularly disappointing scanning session. I was scanning in some 35mm transparencies for a web site, and while the quality didn't need to be brilliant — sharp and bright at 72dpi would have done — the Umax Vista S6E, which is great with reflective stuff, just wasn't up to the job.

Right **The Pictureworks viewer, included in the CD with your scans in Flashpix format, allows you to view thumbnails of all the images, flip, rotate and make basic enhancements**

Below **One of my 35mm transparencies from the Flashpix CD. The quality is easily good enough for web use — and much better than my Umax Vista S6E with transparency hood could manage**

Boots to the rescue!

As I wasn't about to pay ten quid a throw for professional high-resolution drum scans, for a moment I was stumped, and even considered reshooting the pics on print film. Then I remembered PhotoCD, and shot down to Boots with my trannies in my hot little hand.

To put my 35mm transparencies on a CD cost 65p per image plus £4.99 for the CD. If you walk in with a 24-exposure film, Kodak will process the film, provide a standard set of prints, and transfer all the images to CD in Flashpix format for £17.99 including the cost of the CD. It's a multi-session CDR, so thereafter the cost is £13.99 per film and you can fit 300 images on one CD. The turnaround time is one week.

The quality was more than adequate for web use, and on a tight budget I'd certainly consider using it for print, say at small sizes in a catalogue or something like that.

Flashpix is a resolution-independent format; or to put it another way, it stores images in a hierarchy of multiple independent resolutions. The hierarchy is created by starting with the highest resolution, which is determined by the scanner, digital camera or whatever the input source happens to be.

The next resolution level is created by halving the horizontal and vertical resolutions. This process is continued until

Questions & Answers

Q My wife needs to produce some maps to accompany articles on country walks that she writes for a local paper. Currently they are done by hand, by tracing over an OS map and adding various features and place names.

She would like to do this job on her PC, so I am looking for a fairly simple software package that would do the trick. I am assuming it would be best to get an inexpensive graphics tablet to do the input — there seem to be a number available. Mice always drive me up the wall when trying to do this sort of thing.

Can you suggest a suitable package? Also a possible recommendation for a good, inexpensive graphics tablet.

Ian Cargill

A You need a vector draw package which will allow you to import the map scan, then trace over it using a pen tool to draw paths, roads and add features. Most vector packages will do this, the most obvious choices being Adobe Illustrator, Macromedia Freehand and CorelDraw 7. These packages are neither inexpensive nor simple, but they do provide more sophisticated drawing tools, layer features, path editing and effects, and the option of colour-separated output.

A less expensive option would be to go for an earlier version of Draw. Draw 5 has all the features you need and is bundled with CorelTrace, which you could use to do some of the initial legwork tracing the scans.

As for the digitising tablet, it's not absolutely necessary but will make life easier. If you're tracing over a bitmap scan using a Bézier curve tool, it's actually very easy to precisely control the shape of the path using the mouse. What the tablet will allow you to do is dispense with the scan: you can just pop your map on the tablet and trace over it using the stylus.

Most digitising tablets have user-definable function pads so you can, for example, cut, paste and undo just by touching an area on the tablet with the stylus. At £99 the Wacom Artpad is pretty good value at the moment. It has a 4 x 5in area and comes with Wacom's Ultrapen — you flip it over and the other end works like a pencil eraser. In choosing your software, make sure you pick an application which supports the Artpad's 256 pressure-sensitive levels.

■ Starting this month, in common with other *Hands On* contributors, I'm going to give away book tokens to readers who I think are deserving. So this month's book token goes to whoever can answer Kyle Lamb's question about apparent inaccuracies in CorelDraw 7:

Q I am a professional user of CorelDraw 7, with familiarity of all the suite range since version 3.

A client recently gave me over 100 graphical images of fish, which they want printing in similar sizes, maintaining proportion. This was only one part of the job, which is why my method might seem longwinded. I've worded the instructions so you can follow them:

1. Create a new A4 landscape page within CorelDraw 7. Open the Transform - Size box (making sure "Proportional" is ticked).

2. Insert a new, small JPG from a file, as an object (don't link it).

3. In the size dialog box, make a note of the image's dimensions. Change the Vertical length to 171mm. Make a note of the image's dimensions:

/* V: 14.39 H: 27.09
V: 171.0 H: 292.344 */

4. Click and unclick the "proportional" box twice.

5. Change the Vertical length to 171mm.

6. Make a note of the image's dimensions:

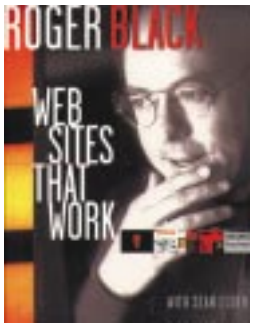
/* V: 14.39 H: 27.09
V: 171.0 H: 321.917 */

There is a difference between the two horizontal lengths. Why? If you calculate the difference using a calculator, the later dimensions are correct. I can't see any reason for this change, and the difference is considerable.

Corel, what do *you* think?

Two people are ineligible from earning a book token — Mr Lamb himself and anyone from Corel, though they are of course welcome to help out if they can.

Book reviews



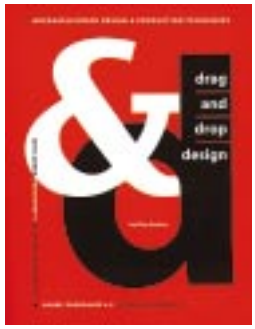
Web Sites That Work
Author Roger Black with Sean Elder
Publisher Adobe Press
Price £41.50

As you'd expect from someone with a background in print design — Roger Black was art director of the *New York Times* and *Rolling Stone* magazine — *Web Sites That Work* is more about design than implementation. If you're looking for tips on how to produce Javascript buttons or animated gifs, you won't find them here. In fact, a cursory glance at *Web Sites That Work* could easily leave you with the impression you'd just read Magazines That Work, Posters That Work or Covers That Work. Which is not a bad thing, because of course web sites, like any other media that bring together words and pictures, benefit from the application of broadly similar design principles.

Web Sites That Work progresses from fundamental principles of design with a nod in the direction of the history of design and typography, through to online considerations like writing for the web, video and navigation, then on to broader issues like the web's suitability for commerce, how to build a web publishing team and handling clients.

The book is filled with hundreds of examples of design, from the covers of *Esquire* and *Rolling Stone*, book jackets, adverts and magazine spreads. As the content becomes more web-centric, so does the illustration, and we're treated to screenshots from the Discovery Channel, Infoseek, Pointcast, MSN and Hotwired to name but a few.

Accompanying these beautiful visuals, Black's text, supplemented by short sections from colleagues, friends and clients, provides a valuable insight on those important aspects of web-site design and production that most "how-to" manuals don't even touch on.



Drag and Drop Design
Author Clay Andres
Publisher Adobe Press
Price £36.50

While this book will undoubtedly be of some use to anyone who spends their working day hopping in and out of Photoshop, Illustrator and PageMaker, with the occasional visit to Pagemill, Dimensions and Acrobat, reading the evangelistic introduction you can't help raise an eyebrow here and there. Where, for example, it makes the claim for Photoshop, Illustrator and PageMaker "each... the leader in its product class, setting the standard by which all other programs are measured", you can't help but think, Photoshop, OK; Illustrator, maybe; PageMaker? Give it a rest. Once you make it past the introduction, there is a great deal (more than 300 pages) of information on things like how Adobe's applications utilise memory under MacOS and Windows, how the various file formats work, and when and how you can drag and drop between applications.

The trouble is that this book should be half the size and better organised. It's padded out with a pile of inappropriate little sections on everything from colour theory to pocket design tips (where to put drop caps, for example). Speaking as someone who enjoys reading technical manuals, I found this approach hard going. It would have been more accessible, and much more useful, as an indexed collection of tips.

you are left with one 64-pixel square tile.

Another fundamental feature of the Flashpix format is that it divides the image into 64-pixel squared tiles. Tiling allows Flashpix-optimised applications to work much more quickly as edits can be selectively processed — only those tiles affected by an edit need be read.

Flashpix records edits as "viewing parameters" — operations to be applied to the original file. It currently supports cropping, filtering, rotation, scaling, shearing, colour correction, contrast adjustment and stretching in the image view.

This approach not only saves you time, it uses less disk space. This is because there is no need to save the original image in addition to any edited versons: in Flashpix the original image data and the edit are part of the same file. Flashpix employs Microsoft's OLE Structured Storage as a "wrapper" around Flashpix files, making them interoperable with OLE II and OpenDoc applications. Image views can be stored as separate, structured, storage "container" files and linked to the original image. So you can have as many image views as you like, but only one copy of the original image.

Multiple-resolution file formats that make use of selective processing to speed image editing, are nothing new. Live Picture introduced the idea with its image editor of the same name in the early nineties, and it's clear that Flashpix has a lot more in common with the original Live Picture format than just the concept. Macromedia's Xres also uses a similar format. But while both these applications trashed Adobe Photoshop in terms of performance, the professionals decided their interests were best served by sticking with what had become the industry standard and packing their Macs with as much RAM and hard disk as they could get their hands on.

A friend indeed

Flashpix faces a friendlier future. For one thing, it's aimed at home users for whom ease of use is a bigger priority than it is for professionals. It also has the support of just about every application developer worth mentioning. Applications which currently support Flashpix include Adobe PhotoDeluxe 2 and Photoshop 5 (you can get a plug-in for Photoshop 4), Corel Paint 7, Debabelizer 4.5 and Kai's Photo Soap.

You can find out more about Flashpix on the Kodak web site at www.kodak.com. If you want to look at some Flashpix samples, check out www.kodak.co.uk/daiHome/flashPix/flashPixSamples.shtml. You will need a Flashpix-enabled application. The Kodak web site has a link to pictureworks.com where, it says, you can download a viewer, but in fact it just gives you a US toll-free number to call which won't be much use. Try downloading Paintshop Pro from www.jasc.com instead.

Feedback on fonts bundle

To all those eagerly awaiting my promised shareware fonts bundle, I can only say hang on, it's in the pipeline. Following the suspension of the waughzoo font archive while they sort out the copyright situation on some of the fonts they were offering free to all and sundry, I've come over all cautious about potential copyright infringement and am being scrupulously careful about what to include.

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Play the game

Benjamin Woolley gives advice on how to get your 3D graphics into a game without the arduous task of complicated programming. The techniques learned are useful for all 3D graphics work.

You are an artist, not a programmer. You work with 3D graphics to produce exciting imagery which you would like to be used as part of a game. However, the level of programming expertise required to develop a game goes way beyond your technical competence and, anyway, the idea of grappling with C++ leaves you cold.

If this is your view then you may feel that experimenting with graphics for games is strictly for the nerds. This month I want to show that it is not and that even if you never produce 3D content for arcade-style games, learning the techniques associated with creating it will provide you with useful disciplines for all sorts of 3D graphics work.

Techniques

What, then, are these techniques? They are related to the central problem of rendering 3D graphics in real time, which is speed.

When you want, say, a car to race round a circuit, swerving around vehicles and obstacles, you are effectively asking the computer to render a full-screen animation on-the-fly, frame by frame. This is a lot to ask of any consumer hardware. Games consoles have special graphics hardware built-in and are designed to speed up the process. Now, many PC graphics adapters have 3D accelerator chipsets like Permedia and Voodoo which enable Windows-based systems to compete with the game-playing power of the consoles. It is this hardware that needs the programming.

You could use DirectX, for instance, which provides a standardised interface to most 3D accelerated PC graphics cards, input devices like joysticks and other forms of output devices such as sound or force-feedback. Even if a game makes optimum use of such hardware, it is still the 3D content, often created using conventional authoring tools, that can ultimately determine how smoothly the game runs and how good it looks. That is why the key to games graphics is recognising the compromises you have to make and understanding how you can meet them.

Using NetYaroze

Last month I mentioned Z2, a game produced by an aspiring game development company called Mobius Codeworks (www.codeworks.demon.co.uk) using the NetYaroze platform. The 3D meshes and textures used in the game were created by Andy Webb and the games engine was programmed by Jim Pitts. Andy sent me an email pointing out the challenges he faced in creating the game. I hope he will excuse me quoting him at some length, but he provides an authentic insight into the nitty gritty of working on these types of graphics:

"*The main problem with creating the models is the polygon count. The hardware within the NetYaroze is powerful enough to manipulate fairly complex meshes, but the processor lags behind. Also, with a number of meshes on screen, as well as the polygons and textures needed for the 3D world, most models need to be about 200 polygons or less.*

"*The process of actually creating the mesh is simple. I decide on a rough idea of how I want the model (robots in this case) to look. I start adding the primitives into the modeller to create the mesh. The main problem areas occur with circular primitives (such as balls or cylinders): these can have a large number of sides and that wastes a lot of the precious polygons on a model. I try and keep most circular objects to six or less facets or segments. This keeps the appearance of a round object but keeps the polygon count as low as possible.*

"*Further polygons can be saved by removing faces or areas that cannot be seen. For almost all the meshes, the undersides are deleted. Internal polygons can also be taken away, since they are never going to be seen, and small polygons are completely removed.*"

Although he is writing about his experience of using the NetYaroze, what he says applies to every platform there is, PC included. The key for all of them is keeping the polygon count down. Achieving this is essentially about clever modelling and texturing. Let us consider some examples.

Clever modelling and texturing

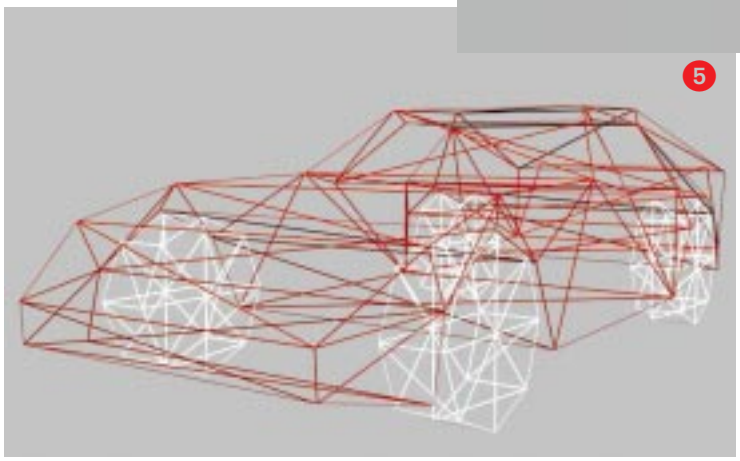
Suppose you want to build a car to race around a track. The car could be made using a box, one of the simplest primitives of all. You could use a big one for the main body, a smaller one for the cabin.

A box is made up of just 12 triangular polygons, so you could have your car for just 24. You could even reduce that number to 20 by removing the polygons (or "faces", as some packages call them) on the undersides of each box. It would not look very special but with a little texturing it might just look recognisable.

Suppose you wanted to add four wheels to this car? If you tried modelling a tyre (basically a torus) with 12 segments (imagine the segments of an orange) and a reasonably rounded cross section, you would add over 250 polygons for each tyre — and that's before you've included hubs, spokes and wheel arches!

So, a much better alternative is to model

These models are of a Ferrari. They are samples from Infografica's REM 3D Models Bank (www.infografica.com) supplied with 3D Studio MAX release 2, which I shall be looking at next month. Fig 1 is a high-detail mesh draped with high-resolution textures. The textures alone take up over half a megabyte of memory, while the model itself contains nearly 100,000 polygons. By contrast, the model in Fig 2 contains a tenth of that number, which is still too many for standard real-time rendered games, but getting there. Fig 3 is, as you can probably tell, low resolution: just 224 polygons and perfect for gaming. Figs 4 & 5 show the meshes used to create Figs 2 & 3. As you can see, the biggest loss in the model with the lowest level of detail is in the bodywork, which has lost most of its curves



each wheel as a cylinder with, as Andy suggests, six segments and one end missing (the end facing into the car), and then texture the closed end of the cylinder with an image of a tyre wall and a hub. If you used an opacity map, you could even simulate spokes.

There is a general rule here: don't model it, texture it. Trees and buildings can be created by putting textures on flat planes, using opacity maps to ensure they have the right profile. If you must use meshes, consider creating different versions with varying Levels of Detail (LOD). Most games engines support LOD, loading in meshes with progressively higher levels of detail as the object gets closer to the current POV.

The best way to create LOD meshes is to start with the highest detail you need and use that as the basis for creating the models with less detail. You might do this by deleting faces from the detailed model and saving the result under a different name, or by using the model as a template for creating simpler meshes from scratch.

Tiling is telling

Even if you can use textures rather than models, you still have to be frugal. They need to be able to fit in memory all at once, along with the geometry. To achieve this, they must usually be no more than 256 colours and wherever possible, tiled. For a building, you might have a tiny patch of stone or brick as your map, repeated over the building's surface, with windows as separate maps laid over the top (if layering is allowed).

Unfortunately, tiling is very telling. It is hard to give a convincing look to a brick building when every brick, or even every third brick, is identical. It is advisable, then, to avoid realistic textures and use stylistic ones instead, perhaps with the cartoon quality you get from using a small number of saturated colours.

You can also use a clever combination of texturing and modelling to create shadows which are otherwise impossible to compute using a real-time renderer. For example, to create the shadow a moving object will cast on the ground, you create a silhouette of the object, soften the edges in a 2D paint program and then apply the result as a texture map to a plane placed beneath the object. By attaching this plane to the object, the shadow will follow it around but not in a way that truly reflects any change in the position of light sources.

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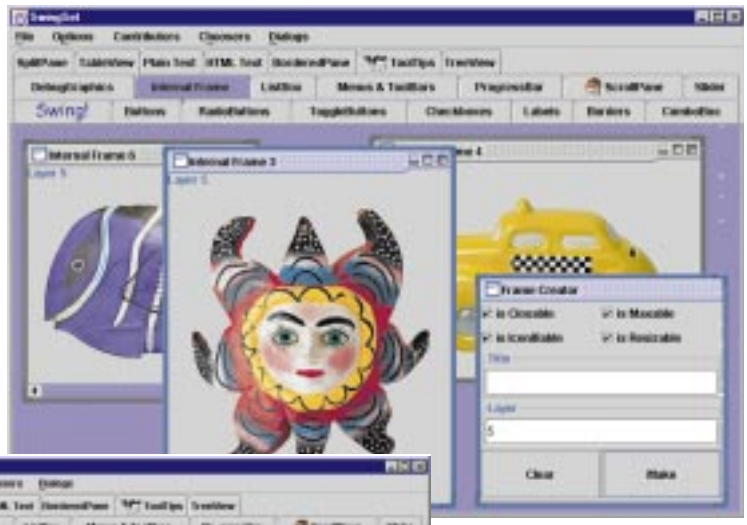
The **Swing** thing

Tim Anderson takes a look at the full release of Swing for Java (which helps with building graphical interfaces) and gives an overview of version 4 of the Clarion development tool.

While Microsoft prepares for the launch of another version of Visual Studio, including the Windows-ready Visual J++ 6, Sun has upped the stakes with a full release of Swing, also known as the JFC (Java Foundation Classes).

Despite the hype, real-world Java suffers from several problems. One is compatibility, another is performance and a third is the weakness of the AWT (Abstract Windowing Toolkit) for building graphical interfaces.

Swing addresses the last of these. It extends the AWT with a new set of components offering many new features. Swing widgets also differ from AWT widgets in that they avoid using peer-based components. (These are objects created by the native operating system, but managed by the Java Virtual Machine). This is a simple way to imitate the look and feel of the host platform but has the disadvantage that you have little control over the appearance of the widget.

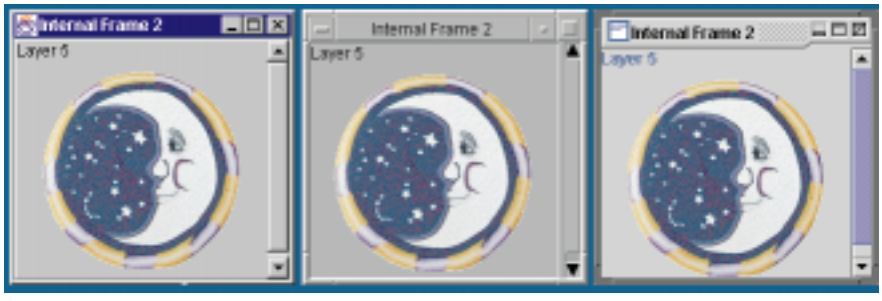


Left Floating Java windows? No problem with Swing. This also shows the new Metal GUI

Left, below Swing does tables, with click-and-drag resizing of columns

By contrast, the Swing components inherit from the AWT's Component and Container classes, via a new JComponent class, and handle their own painting so that the JVM has full control of their appearance. The result is a feature called "pluggable look-and-feel" (PLAF) which lets you specify a graphical interface style. You can even switch between different looks at runtime.

Currently on offer are Motif, the leading Unix GUI, and Windows, familiar to everyone. Macintosh is in preparation. The system is not perfect because, whereas you can use the Motif look and feel on Windows, you can't use the Windows or Mac GUI other than on the platforms they imitate.

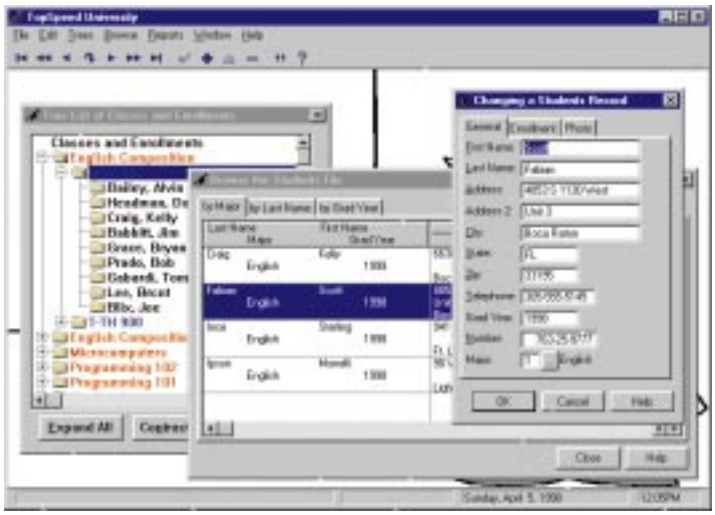


Choose your look: from left to right, Windows, Motif or Metal

The official Java look-and-feel

More interesting than these copy-cat PLAFs are two new ones, unique to Java. The first is called Organic, and is used during development as Swing's default. The second is Metal, and JavaSoft has declared this to be the official Java look-and-feel.

Metal aims to give Java a unique appearance and identity as well as providing a clutter-free graphical interface suitable for cross-platform deployment. It



This school management application has the typical Clarion look-and-feel

will be an integral part of the JDK 1.2; the next major Java version.

Swing is significant because it offers a standardised way to create good-looking Java applications. As you would expect, it is well suited for use in visual programming and will show up in future versions of tools like Visual Café and JBuilder. It is also a shrewd political move, since Java now has a visual identity separate from the Windows environment in which it most often runs.

Exciting stuff, but do not wipe Delphi and Visual Basic from your hard disk just yet. Unless you go the Visual J++ route, you will not easily equal the graphical richness and performance of a native Windows application using Java. But if cross platform matters to you, or if you want an escape route from Windows, Swing is great news.

Clarion 4 Professional

Some products survive against the odds by building a core of loyal users. Clarion is an example of this. It is a database development tool for Windows and is therefore up against Visual Basic, Delphi, PowerBuilder and many other products.

What keeps Clarion developers loyal is that, unlike most tools, Clarion is an application generator. Its nearest equivalent is PowerBuilder but Clarion has an even greater degree of automation. This is not just a matter of wizards and templates, which generally produce shell applications that require substantial additional coding before they are useful. A Clarion application remains under the control of the generator, so in a sense it is also an application maintainer. Clarion also provides a complete business-orientated programming language and a native-code compiler. It can compile both 16- and 32-bit executables via a simple project option, so this is a good choice if you want to target both environments from one set of source code.

Clarion has a more tightly structured development environment than most tools. Typically, projects start with a data dictionary which is a sophisticated affair. At the field level, you can specify a variety of options including validation rules, a default control to display the field, a formatting string, prompt text and column heading. You can also define index keys.

At the table level, the dictionary lets you define relationships and enforce referential integrity constraints. Once the data is set up correctly, the application generator can build a complete application with browse forms for each table and the ability to add, edit and delete records.

In the development environment, application components appear in a tabbed window, with each tab providing a different way to navigate the source.

For example, the Procedure tab shows the application's procedures in a tree view. A double-click opens the procedure for editing. This displays not the source code (although that is available if required) but a dialog with buttons for editing different aspects of the procedure.

If the procedure is linked to a window, you can click the Window button to open a visual form editor. Throughout the editing process, most of the work is carried out by making selections from dialogs, although you can also add your own Clarion code when necessary.

The application generator is template-driven and advanced users can modify the templates or create new ones, effectively creating their own programming Wizards.

Data access is carried out via a set of file drivers. The default is a TopSpeed driver that uses a proprietary data format. Other drivers handle Pervasive SQL (formerly BTrive), various older xBase formats (but neither the latest Microsoft nor Borland variants), SQL drivers for the most common client-server databases (including Oracle and Microsoft SQL Server) and ODBC.

Clarion 4's several new features include enhancements to the environment, the debugger, the language, the database drivers and the templates. The latter now generate code using the Application Builder Classes, taking advantage of the object-oriented language enhancements introduced in the previous version. Full OCX support is now provided and flat toolbars

Fig 1— Simple StringGrid printing

```
procedure TForm1.cbPrintClick(Sender: TObject);
var
prnFile: TextFile;
i , j: integer;
begin

{set font}
printer.canvas.font.assign(StringGrid1.font);
printer.canvas.font.size := 12;

{print text}
AssignPrn(prnFile);
Rewrite(prnFile);

with StringGrid1 do begin

   for i := 0 to ColCount -1 do
    begin
    for j:= 0 to rowCount -1 do
     Write(prnFile, cells[i,j] + chr(9));
    Writeln(prnFile,'');
    end;

end;

System.CloseFile(prnFile);
end;
```

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have appeared for an Office 97 look and feel. Available separately, an internet edition enables you to run a Clarion application through a Java front end.

Clarion is certainly a highly productive environment. Learning it is no trivial matter but skilled users will be able to quickly build standard business database applications, and generating code via templates prevents some categories of errors.

There are reasons, though, why Clarion remains a minority taste. First, it produces applications according to its own model and will only be useful if there is a good match between your needs and the Clarion approach. While, with sufficient effort, most things can be done with Clarion, you will only get high productivity if you are happy to go with the flow of its tools and templates.

Second, to get the most from Clarion requires an investment of time learning the Clarion language, the templates and the class library. These skills will not translate particularly well to other tools, so you need to be sure that Clarion is the right choice.

Third, this is not as slick a product as the latest from the bigger vendors. The environment itself is 16-bit. The interface is quirky, with an annoying tendency to produce layer upon layer of dialog, a tendency that is reproduced in typical Clarion applications, too. Occasionally you find a Help button which when pressed declares: "There is no help for this dialog".

Not everyone will get on well with Clarion but in the end you have to admire what it delivers; rapid maintenance plus rapid application development. Something must keep those users loyal.

Fig 2 — Printing a cell

```
procedure TForm1.cbPrint2Click(Sender: TObject);
var
fontheight: integer;
rect: TRect;
sText: string;

begin

if printdialog1.execute then begin

sText := 'Personal Computer World';

printer.begindoc;

with printer.canvas do begin

pen.width := 3;
font.size := 24;
font.name := 'Arial';

fontheight := trunc(textheight(sText) * 1.3);

rect.Top := trunc((printer.pageheight/2) - fontheight/2);
rect.Left := trunc(printer.pagewidth /2 –
  textwidth(sText)/2 - 10);
rect.Right := rect.left + trunc(textwidth(sText)) + 20;
rect.bottom := Rect.Top + fontheight;

MoveTo(rect.left,rect.top);
lineto(rect.right,rect.top);
lineto(rect.right,rect.bottom);
lineto(rect.left,rect.bottom);
lineto(rect.left,rect.top);

{draw the text}
textout(rect.left + 10,rect.top + 5,sText);

end;

printer.EndDoc;

end;
```

Printing a Delphi StringGrid

R Simons is interested in the tips from previous columns on printing from a memo control. He asks: "*Is it possible to print a TStringGrid?*"

Of course it is possible. But first, an aside. Since printing is such an everyday task you may wonder why only a few Delphi components have a print method. The answer is that although printing *is* an everyday task, it is not a particularly easy one. To obtain good printed output you need to consider things like fonts, headers, footers, margins, word-wrap, page breaks, page numbers and page layout. In most cases, the user will want a degree of control over what is printed, so ideally you need to offer printer and page setup dialogs.

Including a print function in an application is likely to mean a fair amount of work. If you only need rough-and-ready printing and want an easy life, there are a few tricks you can use. The simple memo printing function shown in my March column relies on a feature of Delphi that lets you output to the printer as if it were a file. Therefore, you could use code like that shown in Fig 1. Note that you must include PRINTERS in the Uses clause of the unit. This iterates through the rows of the grid, writing the contents of each cell to the printer and adding a line break at the end of each row. A tab character separates each cell and if you are lucky you will end up with nicely spaced columns in the printout.

Unfortunately, "rough-and-ready" is the right description. This printout will misbehave if a cell contains a string longer than the default tab spacing and the columns will go out of line. It will also look bad if a row is wider than the page width. It will look bad anyway because it has no formatting to distinguish headers from other cells; you are trusting the printer to handle page breaks. If you want the lines of the grid

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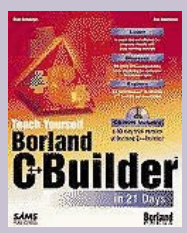
Fig 3 — Changing the desktop wallpaper in 16-bit Visual Basic

```
'Declarations section
Declare Function SystemParametersInfo Lib "User"➢
 (ByVal uAction As Integer, ByVal uParam As Integer,➢
 ByVal lpvParam As Any, ByVal fuWinIni As Integer)➢
 As Integer

'If in a module, declare as global constants
Const SPI_SETDESKWALLPAPER = 20
Const SPI_SETDESKPATTERN = 21
Const SPIF_UPDATEINIFILE = &H1
Const SPIF_SENDWININICHANGE = &H2

'Code to change wallpaper
Sub Command1_Click ()
Dim iRetVal As Integer

iRetVal = SystemParametersInfo(SPI_SETDESKWALLPAPER,➢
 0, "C:\FISHING.BMP", SPIF_UPDATEINIFILE Or➢
 SPIF_SENDWININICHANGE)
'Use "(None)" for blank wallpaper

If iRetVal = 0 Then
MsgBox "Failed to change wallpaper"
End If

End Sub
```

Key: ➢ continued on next line

Book review

Teach Yourself C++ Builder in 21 Days



This is a chunky beginner's guide (by Kent Reisdorph) to C++ Builder, with over 800 pages taking you from the basics of C++ to the internet. The text is clear and the style is friendly but I have several concerns about this type of book. It is targeted at complete beginners, so there is a section on the fundamentals of C++ explaining what variables are, how to use loops and so on. At the same time, the scope of the book is enormous, covering database programming, debugging, DLLs, components, graphics programming and more. As a result, each topic is given only shallow treatment. For example, a chapter enticingly labelled "Building Internet Applications" does little more than explain how to put an ActiveX browser control on a form.

One area where this title is thorough is in its blow-by-blow tour of the C++ Builder interface. This may be handy if you find the official documentation intimidating or if you only have an online version and prefer a printed manual. The important thing is to be realistic and to realise that 21 days with this tutorial will not teach you to program in C++, nor how to develop database applications, nor carry out internet development. Instead, it will get you comfortable with the IDE and you can learn the rest from other books or from online help. But if you are already well past the beginner stage, do not buy this book.

itself to print, you will never do it this way.

To do the job properly, use the canvas property of Delphi's global Printer object. You can draw text and graphics on the canvas, with full control over the results. But this involves a lot more code. To get you started the code in Fig 2 draws a box with some text in it. Using the same principles you can extend it to draw a whole grid (over several pages if necessary). You can discover the dimensions of a page from the printer object's pagewidth and pageheight properties, and use the textwidth and textheight properties of the printer canvas to discover how much space a portion of text will occupy. Naturally, this is dependent on the currently selected font. More detailed information about printer characteristics is available from the GetDeviceCaps API function. It is not difficult, but it is decidedly non-visual.

Experimenting with printer output is a sure recipe for wasting paper. A good tip is to write code that can draw either to the printer canvas, or to the canvas property of a form. Then you can test your layout by drawing to the form. Better still, you will end up with a print preview form with which to impress your users.

Both examples (Figs 1 & 2) are included in a 16-bit Delphi project on our CD-ROM.

Strange request

David Moore asks: "*I know that this will probably sound like a strange request but do you know whether it is possible to set the Windows 95 background image from within an Excel 5.0 macro?*"

The background image, technically known as desktop wallpaper, is set by an API function called SystemParametersInfo. Calling this from VB is no problem. I do not have Excel 5.0 installed here, but the code in Fig 3 works from Visual Basic 3.0.

The one thing this code does not do is to control the tiling of the wallpaper. It will respect the current setting in control panel. I cannot find a function for this so you would need to write directly to WIN.INI or to the Registry in 32-bit Windows. From 16-bit VB, you can use WriteProfileString to set TILEWALLPAPER in the Desktop section of WIN.INI to 1 for True or 0 for False. Even when you run this in Windows 95 or NT, the system is smart enough to make the requisite registry changes for you. You must do this before calling SystemParametersInfo with the SPI_SENDWININICHANGE flag set, so that the change actually takes effect.

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Tim Anderson welcomes your Visual Programming tips and queries. He can be contacted at the usual *PCW* address (p10) or at visual@pcw.vnu.co.uk

Clarion 4 Professional is £405.38 (£345 ex VAT) from Contemporary Software 01344 873434, www.contemporary.co.uk . See also, www.topspeed.com .
Swing (information and download) & the latest Java SDK; www.javasoft.com
Teach Yourself C++ Builder 3 in 21 Days (SAMS, £36.50) is available from Computer Manuals 0121 706 6000 www.compman.co.uk

Outta space?

Bob Walder goes into orbit about capacity planning with NT. Whether or not you needed to upgrade your hardware was once a matter of guesswork but here is an NT tool to help you.

As I write this column roughly three months in advance of it appearing in print, you can understand why, on reading of Cisco's decision to refuse to loan its equipment to any European test labs or magazines for evaluation, I immediately thought "April Fool".

Well, there's definitely a fool here, and I don't think it is me. This bizarre decision comes hot on the heels of Microsoft's attempts to quash independent tests of its products when it does not care for the outcome of those tests. Apparently, it can do this because of a clause in the licensing agreement (by which we are all bound as soon as we open that envelope containing the CD-ROM) which states, in essence, that the software cannot be used for benchmarking purposes without Microsoft's express permission.

In other words, independent test labs cannot simply get hold of NT Server, test it against NetWare and tell you which is the fastest NOS. Nor can we test Exchange Server against GroupWise to say which is the most scalable messaging system — not without Microsoft's permission. By submitting its products for review, Microsoft is, in fact, giving its permission for them to be tested in this way but it leaves the opportunity for all sorts of censorship.

At least Microsoft is being evenly heavy-handed around the globe. Cisco's decision, however, seems to be more of a slur against European networking professionals in particular. Does it not think we are capable of providing a competent review of its products on this side of the Atlantic?

Or is it, perhaps, that it does not trust its own European staff to provide adequate support to labs over here during such tests? Either way, the only option for Europeans interested in lab tests of Cisco kit is to rely on US magazine reviews or to send their own staff to Cisco's labs to work with its technicians using tests designed by Cisco itself.

The latter option doesn't sound too attractive, does it? As for the former, many European readers would rather see the kit tested by home-grown magazines and organisations. That is why so many US-owned publications spend so much money producing their own UK-specific copy rather than simply rewriting the work already done for the US parent magazine.

I make my living from testing network hardware and software. My company runs an independent test lab and I produce a fair amount of material for UK networking publications. Most of the major publishing houses over here have their own in-house labs, as well, but if the likes of Cisco have their own way, there will not be much for us to test in the future and that cannot be good for us poor "second class citizen" Europeans.

Do you not find it just a little bit annoying, this American assumption that they are the centre of the computing universe?

Tip of the month — have you ERD?

One of the worst things that can happen on an NT system is for the Registry to somehow become corrupted, since for many people the only way back from such a disaster is a complete system re-install. There are a number of precautions you can take to avoid this, though.

The first is to back up your system properly. Yes, I know I go on about this time and time again and I am sure I am teaching my granny to suck eggs here, but it is often those of us who ought to know better who end up trying to restore a system from six-month old backup tapes (I am admitting to nothing here!) Even if you back up your data on a daily basis, please make sure that your chosen backup software is also making sound copies of your NT (or Windows 95) Registry database.

Another good tip is to install two copies of NT (Server or Workstation) on your machine. This is not in contravention of any licensing agreements, since you are only ever going to use one copy at a time. The idea is to install a full copy as normal, with all the bells and whistles you require: this will go in the WINNT directory. Then install a second copy in another directory, say WINREPAIR, which is a minimal installation with just enough to get the machine up and running. If you ever damage any part of your primary NT installation you can always boot quickly and easily using the copy stored in WINREPAIR in order to get at your data on the NTFS partition.

Make sure you keep your Emergency Repair Disk up to date. It is tempting when first installing NT to skip right past the bit that asks: "Do you want to create an Emergency Repair Disk?", since it gives you the option to do it later, but how often have we installed NT and never gone back to create the ERD? The thing is, this disk contains a complete copy of your Registry along with a few other critical system files, and it is used during the repair process. This is where you boot into the install process, but instead of installing NT you choose to repair an installation.

Even if you created an ERD when you first installed NT, how many new pieces of software, new drivers, or new Service Packs have you installed since? Every update to your system potentially changes the critical system files stored on the ERD, so each time you make a major change to NT you should create a new ERD.

Go on, now… find that original ERD (if you created one at all), blow the dust off it, drop to the MS-DOS prompt and type RDISK –S. Go on… we can wait.

Capacity planning with NT

"How can I accurately predict how much load my NT Server can take? I am currently running file and print services together with MS Mail for about 50 users. I would like to upgrade to Exchange Server and put the remaining 40 users on the system but will my existing hardware be up to the task, or should I invest in a new machine?"

So writes P Hurley of Bristol, with a question which is echoed almost daily by various consultancy clients of mine. The other favourite is: "Can I run both Exchange Server and SQL Server on the same box?" Questions such as these are asked daily by network administrators up and down the country. Unfortunately, capacity planning is one of those areas where technology consistently falls foul of business requirements.

You know the problem. Your users expect sub-second response time for all their file retrieval and database query operations. They may get it when the system is first installed and there are relatively few users to thrash it. But time goes by and that sub-second response time creeps up to two, five, or even ten or more seconds as application functionality is increased, and more and more users compete for limited resources.

Determining if and when you need to upgrade your hardware is often a matter of pure guesswork and it is not always possible to be sure exactly which components require upgrading. Perhaps it

Book review

■ **Red Hat Linux Unleashed**
Author David Pitts, et al
Publisher Sams
Price £37.50

Have you ever wondered what to do with those spare 386 and 486 machines with 8Mb or 16Mb of RAM that are lying around your office, no longer capable of running the latest and greatest Microsoft operating system?

Why not get yourself a copy of *Red Hat Linux Unleashed* and turn them into web servers, firewalls, mail servers or FTP servers? For those of you unfamiliar with Linux, it is a freeware Unix-like operating system that can run in as little as 150Mb of disk space and 2Mb of RAM! Red Hat Linux is simply a commercial distribution of the Linux OS, which considerably simplifies its installation and configuration.

For those of you completely unfamiliar with Linux (or Unix in general), however, this is not quite the book for you. It assumes a basic level of Unix knowledge (how to log on, move around the system, perform the more basic system administration tasks, and so on) and does not attempt to take you from scratch at any point. This ensures that Unix devotees will get the maximum from this volume (although I must confess to being a complete Unix novice, yet even I managed to install Linux and configure some services with few problems).

If you know a little Unix, however, this book covers Linux system administration and management and how to handle file systems and printers and all that good stuff. In other words, it contains all the information you will need to make a relatively painless transition from other brands of Unix to Red Hat Linux.

It even starts off with a chapter covering Linux installation, taking you through the whole procedure step by step. And in case you were wondering where to get the software, there is a CD-ROM included with version 4.2 of the operating system, together with a complete developments environment and all the OS source code.

Also on the CD is software for network aliasing (virtual hosting), Perl, Python, Tcl/Tk, LISP, a high-performance web and FTP server, Sendmail SMTP server and client, and an X-Windows system. The majority of the book sets about telling you how to install, configure and manage these in a no-nonsense, easy-to-read kind of way. Buy it now, and make the most of all that hardware you were just about to throw into the skip!

p313 ➢

Questions & Answers — can *you* help?

Q I read your column regularly and have seen articles on SAPS for modem sharing on an NT network. But I'd like to share a modem on a network running NetWare 3.12. There are 30 PCs running Windows 3.11 and 95, and five of the Win95 PCs have modems with dedicated lines. But as the number of users wanting access to a modem for email increases, so the cost of dedicated lines becomes prohibitive. Is there a version of SAPS or another product which would allow sharing a modem and a line?

Peter Williams

A Sorry Peter, but I don't know of a product that will do this. I am sure, though, that there must be something out there that will do the job so I will throw it open to readers of this column. If anyone knows of a modem sharing solution for NetWare servers, drop me a line at the usual address and I will endeavour to review the software in a future issue.

is more memory you need, or a faster disk, or a more powerful processor, or perhaps you simply need an additional server?

Today's distributed network model is a far cry from the predictable centralised model of the mainframe era. Then, if you wanted to know how many users the box would support, or how much additional memory you would need to support a specific load, the IBM salesman would arrive with his big blue book and his calculator and tell you exactly how much money you would need to spend. Given the cost of hardware, capacity planning was an absolute requirement and the job title of Capacity Planner existed in every organisation that used IT.

The random adoption of PC hardware coupled with lower costs made the position of Capacity Planner seem superfluous in most companies. But today, many of the mission-critical systems of yesteryear have migrated down to the PC-based LAN and capacity planning is once again becoming a necessity. But where are the tools?

Oakland-based Bluecurve has developed a capacity and reliability planning tool for NT based on a technique which it calls "Active Measurement". Rather than rely on mathematical models which are difficult to create and maintain in a distributed environment, Dynameasure performs a controlled stress test on the actual NT system components. Current modules available include file and print services, SQL Server, Exchange Server and Oracle, with a web server version to follow.

Although any NT server (and even a NetWare one) can be the target of a simple file and print test, in order to run the others you will need to have the appropriate software (SQL Server, Exchange Server or Oracle) installed. Dynameasure works by creating test "data-sets" on the target server using the chosen application. For file and print tests a whole load of different files are spawned: for SQL Server tests, a dummy schema for a sales order processing system (complete with test data) is generated; and for Exchange Server tests, a bunch of different mailboxes and dummy mail messages (with various types of attachments) are created.

The tests themselves then manipulate these data-sets in various ways in order to simulate the activities of real users. Each transaction performs a typical activity that might be performed by a user in a distributed system, such as: update a customer record in an SQL database, copy a file to a server, or send a number of mail messages with huge binary attachments.

The architecture of Dynameasure itself is distributed in nature, allowing the various components to reside on a number of different machines for maximum flexibility and scalability. There is a single Control Server responsible for the underlying functions and communication between components. This must reside on an NT Server and is configured by an intuitive GUI utility, from which tests can be created and controlled and the results analysed.

Below this in the hierarchy is the Resource Client, which provides the communications channel between Test Clients and the Control Server, as well as providing an intermediate repository for statistics collected by the Test Clients. A single Resource Client can handle a number of Test Clients, and the software can reside on a dedicated machine or can co-exist with either the Control Server or a Test Client.

At the bottom of the tree are the Test Clients, which can be either Win95 or NT machines and each client can run a number of "Motors" depending on processor speed

p314 ➢

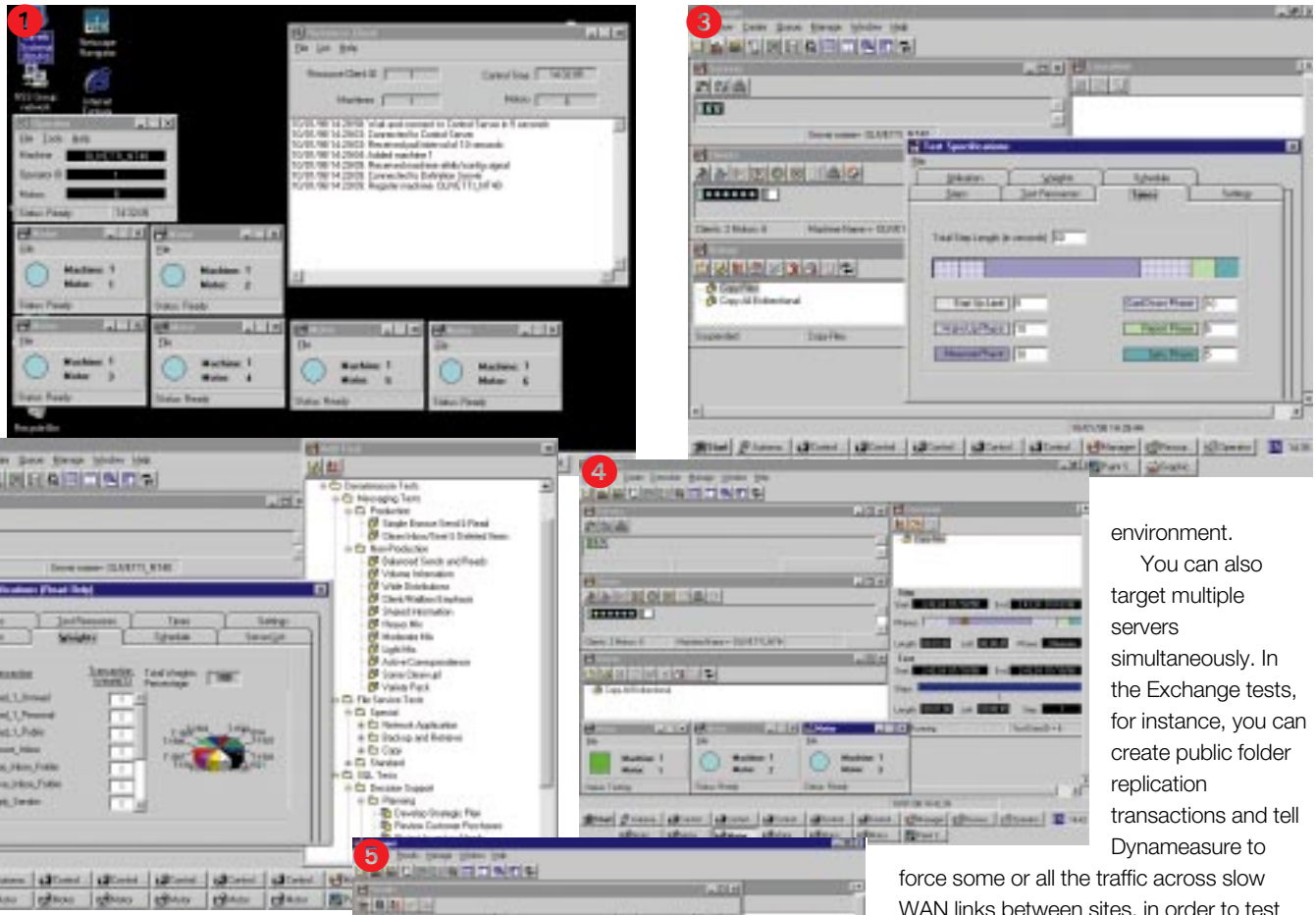


Fig 1 **A number of Motors running on an NT Server**
Figs 2 & 3 **Modifying test parameters**
Fig 4 **Running a test**
Fig 5 **Comparing results of two tests**

and memory configuration. Each Motor is a separate process (representing a separate client) and it is the Motors that execute the transactions against the target servers. Thus, with reasonably-specified clients and a high-speed LAN (100Mbps or more), it is possible to run tests involving hundreds of clients while only using a fraction of that number of PCs.

Each test consists of a number of steps. At each step you can add more Motors, thus allowing a controlled increase in the load, from a single user up to hundreds. At each stage in the test, the Motors collect statistics regarding data throughput, user response time and CPU utilisation and these are collated by the Resource Client and eventually passed to the Control Server. Once the tests are finished, the Manager Utility can be used to produce comprehensive text and graphical reports.

Although a huge number of standard tests are included as part of the package, one of the key features of the Enterprise version is the ability to define your own schemas, data-sets and transactions. This is particularly useful when you need to do some capacity planning for an existing system. For instance, how many users can you add to your sales order processing system before it falls over?

In this situation, you could define your existing SOP data-sets and transactions to Dynameasure and then perform the appropriate load testing against a real-life system to obtain your answer. The product could even be used to aid the database design process by running such tests against a system design which has been defined only in Dynameasure, and which doesn't even exist yet in a production environment.

You can also target multiple servers simultaneously. In the Exchange tests, for instance, you can create public folder replication transactions and tell Dynameasure to force some or all the traffic across slow WAN links between sites, in order to test your WAN infrastructure.

Dynameasure can be used to perform system health checks as well as for capacity planning. Baseline reports can be generated from a normal system and then further tests can be run periodically in order to detect changes in the capacity of an infrastructure over time.

This approach has parallels in other disciplines. Doctors, for example, use stress tests to measure cardiovascular fitness. A treadmill test can detect severe problems immediately and repeated stress testing over time can provide comparisons which can identify potential problems before they become dangerous.

If you need to get a handle on your NT Server capacity and reliability planning, then Dynameasure is worth a look. Contact the UK distributor, the Peapod Group on 0181 606 9990, for more information.

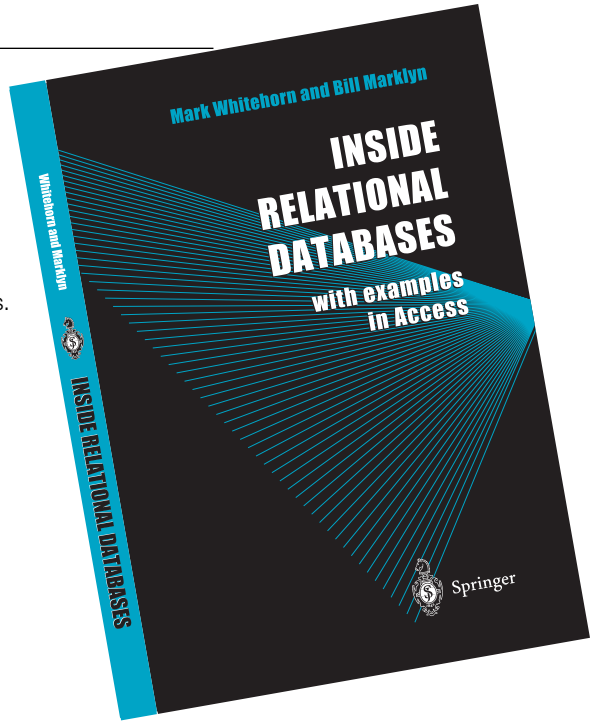
PCW Contacts

Contact Computer Manuals on 0121 706 6000 for Red Hat Linux Unleashed

Bob Walder is a journalist and networking consultant based in Bedfordshire. He can be contacted via e-mail at the usual address networks@pcw.co.uk

PCW Reader Offers

Inside Relational Databases



(reviewed in PCW November 97, p329)

- Written by Mark Whitehorn, who writes *PCW's Hands On Databases* column.
- Explains everything you need to know to create efficient relational databases.
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- Collected interviews from *Personal Computer World*, including Bill Gates, Michael Dell of Dell Computers and Intel's Andy Grove.
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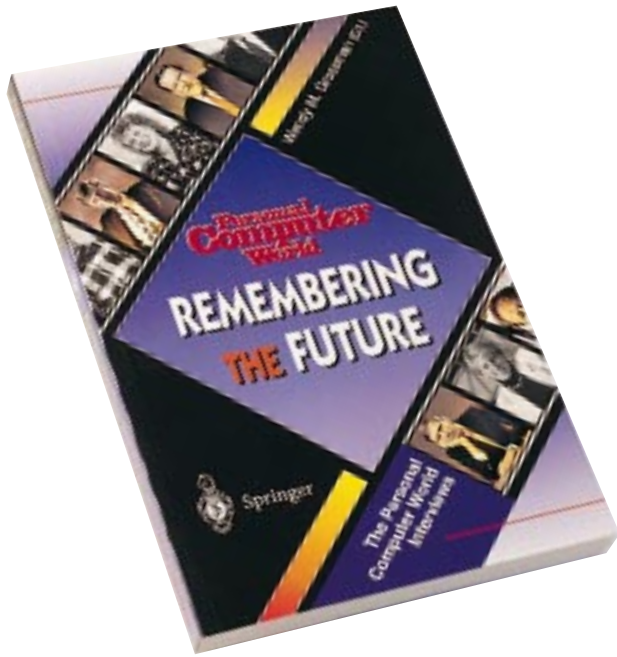

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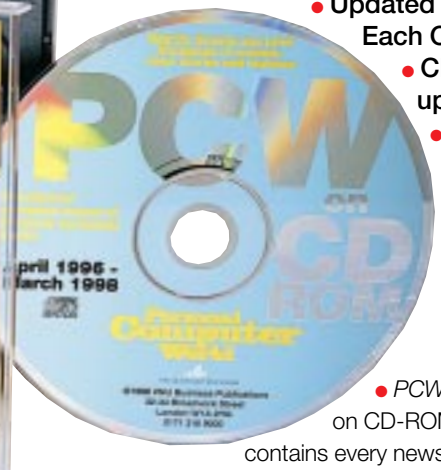

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Win a CIDCO iPhone

No ordinary dog and bone, this — it's a revolutionary first. It's a net-capable phone and you could win one to use on your desk! *Woof!*

According to research carried out by CIDCO, by the year 2001, forty-seven percent of all internet access will be via an iPhone device. The iPhone, reviewed in our *First Impressions* section in the April issue and worth £499, is the world's first advanced internet telephone, designed to provide easy plug-and-play access to the worldwide web. You can try your luck at winning one this month.

The iPhone is a great email client and browser for those who use the net in a transactional way, surfing to get information quickly. It looks like any other telephone except it has a greyscale, touch-sensitive, 640 x 480 screen that displays six large icons. When touched, the internet icon will dial up, log on and download the default or chosen page, and you can read, reply to and send email. A neat keyboard slides out for you to enter web addresses.

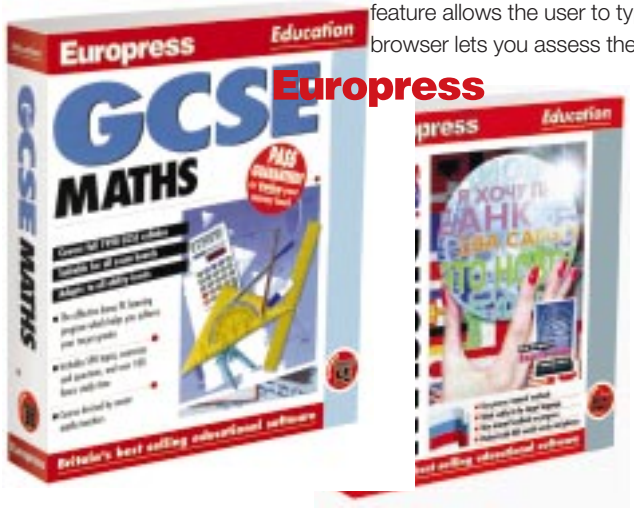
To enter this competition, mark your postcard "CIDCO comp" and send it to the address address below (*box, right*).

Win Europress software

Mind your language… and your maths. Improve your exam results with these teaching packages.

Europress' new range of educational packages includes Russian Language Labs and GCSE Maths. We are giving away five of each of these two products, individually retailing at £19.99.

GCSE Maths can help students improve their exam grades. There are 590 topics, exercises and questions, providing over 100 hours of study time. It covers all areas of the 1998 GCSE Maths curriculum and is relevant to all examining boards. Students can choose from foundation, intermediate or higher levels, and tailor the program to their individual needs. The Russian Language pack includes over 800 common words and phrases, plus 200 exercises. Tuition is based on the association of three elements: the spoken word, the written word, and a wide selection of colour pictures. Users can adapt the material to their own favoured learning style, using different combinations of the three elements. A dictation feature allows the user to type-in spoken words. A browser lets you assess the content of each chapter, there's a comprehensive tutorial section and a voice recording facility



To enter this competition, mark a postcard "PCW/Europress comp" stating your preferred choice (Russian or Maths) and send to the address above (*box, right*).

How to enter our competitions

1. Via our web site at www.pcw.co.uk
or
2. Write your name, address and daytime telephone number on a postcard, or on the back of a sealed envelope. Mark your card with the name of the competition and send it to: P.O. Box 191, Woking, Surrey GU21 1FT.
Entries must arrive by 31st July 1998
• State clearly on your entry if you do not wish to receive promotional material from other companies.

Rules of entry

These competitions are open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, CIDCO, Ruskin Emerson and Europress. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

Final Fantasy VII

PREVIEW

Following its amazing success on the PlayStation, Final Fantasy VII is soon to arrive on the PC courtesy of Eidos, creator of Tomb Raider II. Set in the classic RPG mould, the game tells the story of Cloud Strife and his battle against the evil Shinra Inc.

Shinra, a world-dominating power company, has discovered a way to mine and exploit the energy that creates the universe itself. The company is opposed by Avalanche, a small but effective

resistance movement on a mission to save the environment at any cost. As hired mercenary and ex-Shinra employee, Cloud, you must join the resistance to try and stop Shinra draining the life from everything.

The plot is complicated but there's plenty of action to be had in the game's massive 3D world. There are many enemies to fight, spells to master, plots and puzzles to be untwisted and solved. Cloud is armed with a double-handed sword, perfect for getting your point of view across, and each member of Avalanche has their own special abilities which must be exploited at just the right time if the planet is to be saved.

This Alpha preview version of Final Fantasy VII required a 3DFX card to run and the graphics look even better than the PlayStation original. I can't wait to get my hands on the final release.

Chris Cain

PCW Details

Price To be confirmed

Contact Eidos 0181 636 3000 www.eidos.co.uk

System Requirements Windows 95, P133, 4X CD-ROM, 16Mb RAM, DirectX 5.0 compatible sound and video card.

Star Rating Not applicable until final release.

Forsaken

Personal Computer World Recommended

The big 3D shoot-em-up of the summer looks set to be Forsaken, the ground-breaking new release from Acclaim. The year is 2113 and the Earth has been devastated by a fusion reaction caused by scientists playing with matter "at its most basic level". The explosion forces the Earth out of orbit and towards the sun. Soon it is nothing but a floating cemetery. The galactic council, the ominous Imperial Theocracy, steps in and

leaves robots stationed throughout the planet to prevent scavenging. This naturally attracts the scum of the galaxy — that's you!

Choose your alter ego from a cast of 16 mercenaries before heading off to pillage the Earth and pocket the proceeds. There are 16 labyrinthine levels in all, including sunken ships, the Mir III space station, and a beautifully-rendered Cities of Gold-type Aztec temple.

Forsaken boasts some of the most "intelligent" enemies ever seen in a shoot-em-up, and the killer robots left behind by the Imperial Theocracy rapidly develop their cunning and skill.

I cannot overstate how beautiful this game is to view: the artwork and texturing are breathtaking. So intoxicating are your surroundings, that you can find yourself simply admiring the scenery instead of shooting your enemies. Forsaken is fast, compulsive and good-looking. You won't see a better game this year.

Paul Trueman

PCW Details

Price £39.99

Contact Acclaim 0171 344 5000 www.acclaim.co.uk

System Requirements Windows 95 with DirectX, P120 or better, 16Mb RAM, 4X CD-ROM, Direct3D compatible graphics card.

★★★★★

p322 ➢

Star Wars Supremacy

Last year Star Wars Trilogy was released and now here is Star Wars Supremacy, the definitive game from the same team. Drawing on their unique knowledge of the film series, Lucas Arts has created a work of art in its title sequences.

The story picks up where the first film left off. The Death Star has been destroyed and we find the Empire and the Rebels once again at each others' throats. What then follows is, unfortunately, a rather ordinary strategy game. Select your side, depending on your preference for good or evil, and you will be presented with a comprehensive and fairly lengthy briefing session detailing everything your team knows about the opposition.

Once the briefing is over, it is up to you to strengthen your forces. Use the resources at your disposal to build mines and training camps. Send your officers on espionage or fact-finding missions. Despatch your fighting ships to conquer neutral planets or those siding with your opposition.

With the growth of the net-connected population more and more games incorporate facilities to hook up with your friends, and Supremacy is no exception. But if you have nobody with whom to connect, never mind. You still have the option of playing this real-time strategy adventure against your PC.

Nik Rawlinson

PCW Details

Price £39.99

Contact Lucas Arts 0171 368 2255
www.lucasarts.com

System Requirements Windows 95, P90 processor, 16Mb RAM, 4X CD-ROM, sound card.

★★★☆☆

Legacy of Time

In this third instalment of the sci-fi-tinged Journeyman Project you assume the role of Gage Blackwood, Agent 5 of the Temporal Security Agency (the TSA), who is desperately attempting to save the Earth's future by returning to its long-lost past. You must time-travel between the three mythical time zones of Atlantis, El Dorado and Shangri-La in a Myst-style adventure which involves much puzzle-solving and lateral thinking.

The game is sumptuous to look at and involves more than simple pre-rendered stills of each location. You are given the opportunity of a 360-degree panoramic view at each point but can only follow a few set paths between each location. But this is where the problem with the game lies: even though the visuals are of the highest order, you never really feel in control. To add to this, there is some awful acting, via full motion video clips, and a very annoying robot sidekick who cracks terrible jokes while educating you on your historical surroundings.

Nevertheless, the environments into which you are thrown are mesmerising. Fans of the adventure-game genre will lap it up, but to the rest of us it will feel like an excuse for Presto Studios to show off the talent of its artists, rather than delivering any innovative gameplay.

Andrew Robertson

PCW Details

Price £34.99

Contact Broderbund Software 01784 431000
www.journeyman3.com

System Requirements For PC: Windows 95, P90 or faster, 16Mb RAM, 4X CD-ROM, SoundBlaster 16 or 100% SoundBlaster 26-bit compatible sound card, video and sound card compatible with DirectX.

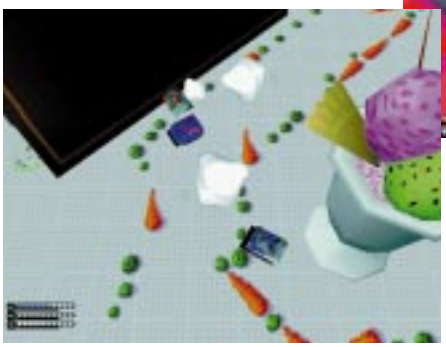
For Mac: PowerPC, System 7.1.2 or higher, 80MHz or faster 16Mb RAM, , 4X CD-ROM.

★★★☆☆

Micro Machines V3

Micro Machines V3 was a half-million seller when it was released for the PlayStation. Now, PC-owners have the chance to experience the thrills and spills of Micro Machines for themselves.

Essentially, it is a simulation of a car racing game the way children have traditionally played it: racing tiny toy cars around household objects. Previous versions of the game took place in a 2D birds-eye view of the action, whereas this new release races you and the other micro machines in a full 3D environment. The point-of-view camera swoops around the cars as they zoom round 48 different circuits, each more surreal and fiendishly difficult than the last.



The courses place you in various vehicles, each of which has a different level of traction and speed. You race around the course, picking up "add-ons" and trying to sabotage your opponents. Household objects take on surreal proportions compared with the size of the tiny cars, and there are courses that race you around gardens, crossing ponds on giant lilies, or in kitchens where you jump over cereal boxes into cavernous sinks.

Gameplay is ideally suited to the young. It is madly colourful and bears no resemblance to real driving. There is no depth whatsoever to this lunatic, addictive, infuriating game, and it's all the better for it.

Paul Trueman

PCW Details

Price £34.99

Contact Codemasters 01926 814132
www.codemasters.com

System Requirements Win95, 16Mb RAM, 4X CD-ROM, DirectX 5 compatible. P166 + 2D card (640 x 480 res) or P120 + 4Mb 3D card (high res).

★★★★☆

Triple Play 99

Take a bat and a ball. Stand in the middle of a stadium in front of a crowd of thousands and hit the ball with the bat. That, in essence, is the idea behind baseball, possibly one of the simplest games known to man. Simple ideas are always the best, and so it was only a matter of time before this CD arrived for your PC in the form of Triple Play 99.

You can play in any one of 30 baseball stadia across the US. Each stadium has been carefully modelled using photos of the actual buildings and the gameplay puts you right at the heart of the action. One moment you are bat in hand, hitting for the boundary and racing to make that home run. The next, you find yourself pitching at the opposing team or capturing a player between bases.

This is the ultimate baseball simulator, letting you play on both sides. And if you're after something a bit more meaningful and fulfilling than a one-off throw-away experience, you can play a whole season of games. For many UK players Triple Play 99 will be their first experience of baseball, and if this is just a patch on what the real thing is like, you'll be itching to cross the Atlantic and play this rounders spin-off yourself.

Nik Rawlinson

PCW Details

Price £39.99

Contact Electronic Arts 01753 549442
www.ea.com

System Requirements Win95, Pentium 90MHz processor, 16Mb RAM, 4X CD-ROM drive.

★★★★☆

p324 ➢

Swing space

A comparison of Actua Golf, Golf 98 and Golf Pro.

(1) Actua Golf
(2) Golf 98
(3) Golf Pro
(4) My scorecard

Why did the golfer wear two pairs of trousers? In case he got a hole in one. Okay, it's a terrible old joke. And although you might think the same of the many golf games now on the market, you could be mistaken.

Actua Golf 2

Golf 2 joins a well-established stable of sport simulation titles from Gremlin, but this product was generally disappointing. On-screen movement was jerky and the resolution of the images was fair only. Sounds were poorly synchronised with the action and commentary often bore little relation to the results of my shots. Having missed the hole on a putt I was congratulated with "That was an okay putt but it did the trick". Aiming and striking the ball is easy; a matter of dragging a line of flight and clicking three times respectively.

Microsoft Golf 1998

Golf 1998 presents a selection of four beautifully-rendered courses. Gameplay was a little slow on a P90, but when installed on a 300MHz PII reactions were smooth and instantaneous.

Four types of swing include basic two- and three-click options, as well as a backwards and forwards mouse movement and the ultimate cheat's option, Sim Swing, where the software does it for you.

The Golf Pro

This one is a visual feast. With a unique control interface, players find themselves moving the mouse from side to side to tee off, hit and putt.

Wildlife and background noises were realistic and unobtrusive, and by electing to start each hole with a fly-by, I was treated to an aerial view of the course and tips on how to play it. Infinitely customisable, I could even alter the weather conditions, make individual holes harder or easier, and select from any of ten players.

Minute variations in the angle of the mouse, or the time of releasing the button, change the direction and power of your swing, but once you have practised for some time it gives you unrivalled control. To get you accustomed, the game commences with a comprehensive step-by-step tutorial and mouse calibration.

Commentary is relevant and helpful. A selection of pre-recorded players will allow you to play against others even if you find yourself alone at home. Illustrative, white, pen-based graphics are overlaid on distant or overhead views to explain suggested strategy.

You will be amazed by the realistic graphics that put you right in there on the fairways of either St Mellion International in Cornwall or Hilton Head in South Carolina, USA. The backing music and ambient sound lend this title a feeling of true quality. A hole in one indeed.

Nik Rawlinson

PCW Details

Actua Golf 2

Price £39.99

Contact Gremlin Interactive 0114 279 9020
www.gremlin.co.uk

System Requirements Win95, Pentium 75MHz (P120 recommended), 16Mb RAM, DirectX 5.0, 2X CD ROM.

★★★☆☆ *(heading for a bogey)*

Microsoft Golf 1998

Price £34.99

Contact Microsoft 0345 002000
www.microsoft.com

System Requirements Win95 or NT, Pentium 90MHz, 16Mb RAM (24Mb RAM under NT), 4X CD-ROM, 2Mb VGA card, sound card.

★★★★☆ *(level par)*

Golf Pro

Price £34.99

Contact Empire 0181 343 9143
www.empire.co.uk

System Requirements Win95, P90 (P133 recommended), 16Mb RAM, 2X CD-ROM, sound card, 1Mb video card.

★★★★★ *(hole in one)*

Brainteasers

Quickie

• A worm crawls around a garden roller from a point on the circumference at one end, to the corresponding points on the circumference at the other end. Had he crawled in a straight line he would have covered 3ft (the length of the roller). Instead, he chose to circumscribe the roller during the journey. If the roller has a circumference of 4ft, what is the least distance that the worm could have travelled?

This month's prize puzzle

Not too difficult. It can be done analytically, or if you feel really ambitious you could even solve the problem by making a full-scale model!

• Two strips of wood of equal length are graduated into 1,459 and 1,001 equal parts respectively. If they are placed side by side with their ends together, which of the respective graduations would be nearest to each other?

Send your answers on a postcard, or on the back of a sealed envelope, to: PCW Prize Puzzle July 1998, P.O. Box 99, Harrogate HG2 0XJ, *to arrive not later than 20th July, 1998. Do not send solutions on floppy disks, in emails, or in envelopes.*

Winner of the April 1998 prize puzzle

A surprisingly low entry (only 60 replies) to our rather simple problem about the electricity and gas bills with the interchanged pounds and pence fields. Maybe it was so easy that many of you didn't think it was worth entering? Anyway, the answer is that the gas bill was £50.49 and the electricity bill was £49.50. The winning entry, chosen at random, came from one of our regulars and a three-times previous winner — Andrew Simpson, of Perth. Mr Simpson first won in October '86, then again in October '87 and then in May '92.

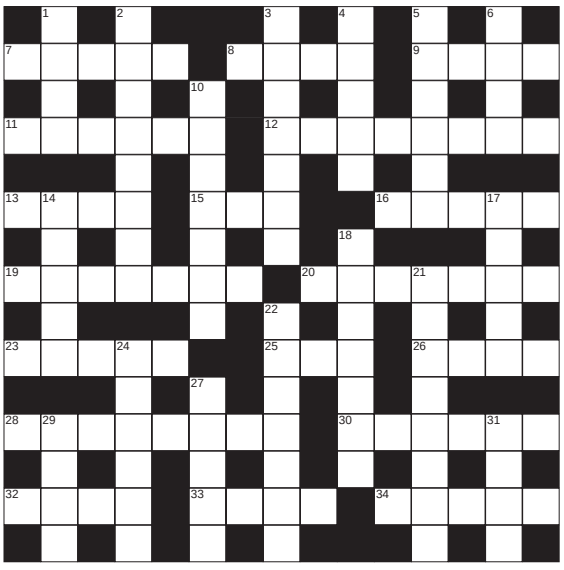
Congratulations yet again, Mr Simpson. Your prize will soon be with you. Meanwhile, to all the others — keep trying, it could be your turn next. And as you can see, there's no ban on multiple winners!

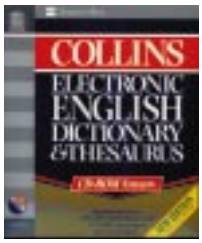
JJ Clessa

Brainteasers entries

Several of you must think that your puzzle entries will be used for a direct mailing database. *I can reassure you that this is NOT the case.* All entries come directly to me and are retained by me, JJ Clessa. After having selected the winner, all entries are destroyed.

Prize Crossword No. 9





Haven't got a clue? Maybe you could do with the help of the Collins Electronic Dictionary & Thesaurus — every month, one lucky *PCW* crossword entrant wins a copy. Send your completed crossword to PCW June Prize Crossword, VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive by 26th June, 1998.

• *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

ACROSS

7 Digital communications, in short (5)
8 Dossier for a saved document? (4)
9 & 19 Business-like PC (11)
11 E-poster? (6)
12 Your own room on the internet (8)
13 Accurate description of the hardware, briefly (4)
15 Web site's business suffix (3)
16 Type of house for the acrobatic illustrator? (5)
19 *See 9 across*
20 Go-anywhere portables (7)
23 & 32 Free-to-use utilities (9)
25 Web site's non-business company suffix (3)
26 Programmer's nuts and bolts (4)
28 Monitor's visual stuff (8)
30 Input's end result! (6)
32 *See 23 across*
33 Any of these slots in a storm? (4)
34 Send it to the laserjet? (5)

DOWN

1 Deep sleep (4)
2 Unspoken (8)
3 Tepees (7)
4 Classic horse-race (5)
5 Thieved (6)
6 ____ Idle, comic actor (4)
10 Farm vehicle (7)
14 Tar (5)
17 Two-legged creature (5)
18 Thailand's capital (7)
21 Speaking very little (8)
22 Queen's husband (7)
24 Sword (6)
27 River mammal, in short (5)
29 Genuine (4)
31 Arm bone (4)

June solutions

ACROSS
7 Networks 9 Laptop 10 Help 11 Megabytes
12 Cache 14 Refresh 18 Sectors
19 Cookies 22 Escapes 24 Syncs
26 Eyestrain 28 Port 29 Server 30 Download
DOWN
1 Relegated 2 Swap 3 Crime 4 Slab
5 Spites 6 Boss 8 Signed 13 Hut 15 Room
16 Area 17 Mercurial 20 Key 21 Demand
23 Shelve 25 Knows 26 Even 27 Turn 28 Pull

A case of **Portfolio**

Simon Collin's 1989 Portfolio is smaller than today's handhelds. It has an expansion slot, runs PowerBASIC and MS-DOS 2.11.

It has been a sad week here at Retro Towers. I dropped my trusty Psion and watched it explode into a thousand fragments. So, being PDA-less, I dug around in my attic for a replacement and unearthed what looked like a standard palmtop, similar in size and weight to the Psion, with a standard clamshell lid. The label read 1989 and it looked like one of the new HP handhelds currently on the market.

It was an Atari Portfolio, one of the best of the first-run handhelds, launched in late '89. Billed then as the smallest computer in the world, it is in fact smaller than many of today's miniatures.

DIP switching

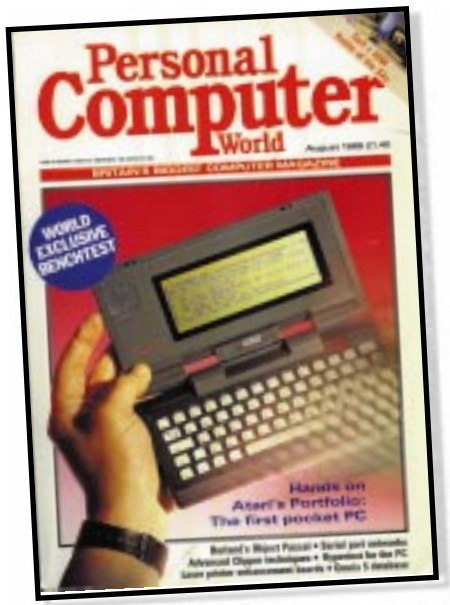
But let's start with DIP, the designer of the Portfolio. It developed this clever piece of kit and used a CMOS version of the 8088 processor (as used in the IBM PC). DIP licensed the tiny computer to Atari, but apparently not exclusively since just a few months later DIP launched its own identical product, the Pocket PC. DIP then bought back finished units from Atari and rebadged them as its own. But while Atari aimed at the general public, DIP targeted the corporate sector. In fact, the DIP version was neater than Atari's and it bundled all you needed into a smart, plastic briefcase.

The Portfolio now looks a little dated, in an angular sort of way. It has a small LCD screen (40 x 8 characters that provides a view on a larger, virtual display) with a speaker/microphone grille taking up a quarter of the space in the left-hand corner. The keyboard is standard QWERTY layout (which is good) but with tiny, cramped calculator keys (which is bad).

On the left-hand side of the unit is an obvious slot. These days manufacturers hide PC Card slots, but back then Atari drew full attention to its expansion capabilities. The slot is proprietary (the PCMCIA standard was still being finalised) and takes an expansion RAM card. The Portfolio was fitted with 128Kb of RAM as standard and this could be divided between the RAM disk and application memory. Once you had set the various options, the 128Kb soon disappeared, so the expansion slot became vital. Cards with 32Kb-1Mb were available from Atari or DIP.

Doing it with DOS

The Portfolio was unusual in its day because it ran standard MS-DOS (2.11). This was supplied on ROM, with a calendar, text editor, contact address book



and a Lotus 1-2-3 compatible spreadsheet. WordPerfect Jr, designed for the IBM PCjr, could also be run. There was a host of neat features: the address book could automatically dial a phone number by squawking the tones from the speaker (you had to place the phone's handset over the screen for this to work), and the calendar had alarms. Manufacturers at the time made strenuous efforts to promote alarms and this was always mentioned in reviews. It was a slower, less cynical world then!

Programmers and general techno-fiends were well catered for with the PowerBASIC interpreted language. This let you create your favourite application and, best of all, attempt to tame the graphics screen control. In addition, the Portfolio programmer could install a nippy Forth compiler, an assembler, or a version of Pascal. And those developing Portfolio applications could use Borland's Turbo C.

As a splendid piece of reverse engineering, but of questionable relevance, the ComputerBooks company produced Portfolio emulators for the PC and Mac so you could turn your powerful desktop into a limited and cramped Portfolio environment. If you really wanted to use your Portfolio as a desktop, an add-on hard-disk unit was released from BSE and a 720Kb floppy drive was available too, although both were bigger than the computer.

Death duty

The Portfolio did have a few drawbacks. Although it ran DOS, it could not run all PC applications, but this is not a real problem in a handheld. It also had a few bugs in the operating system. The best of these, the shotgun bug, overwrote a byte of data at a random address when you switched on, causing all manner of agitation — Atari quickly provided a bug-fix. Commendably, if your Portfolio died in service, Atari would replace it for a modest fee. I wish all manufacturers did this.

The Portfolio's real problem was that it was launched at the end of 1989. So what? Well, this was exactly when the Poquet was launched and the two were always (unfairly) compared. The Portfolio was a £350 handheld organiser with neat touches. The Poquet was a £1,500 PC-compatible that also ran an 8088-compatible processor but had an 80 x 24-line LCD and full IBM software compatibility. The Poquet was overpriced yet stole the thunder in almost all the reviews of the time.

Role model

Nevertheless, the Portfolio amassed a large following. It still has an excellent presence on the web (search Yahoo! for Portfolio). Companies still sell accessories and supply masses of software and general hints and tips. This great little computer has lasted nine years in the cruel world of handhelds, and still offers plenty of features. It's a great role model for manufacturers. ■

Cosmic Family

An animated space-age family that combines learning with fun and love.

Take the dysfunction out of the Simpsons and you'll get the Cosmic Family, a cartoon clan where everyone loves each other, especially the family's cat and dog. The Cosmic family spends the winter travelling through space in a rocket. On board there are games, animations and music to enjoy.

This program has no written words so children can play whether or not they can read, and as the family speaks in cosmic bleeps there's no-one to boss you about or tell you what to do.

Above Have fun with the balloon monsters
Left Everybody will love the family cat and dog

The elevator takes you to the floor of your choice, where you use the cursor to find games, animations and musical sounds. There are jigsaw puzzles and fun activities like sorting socks and shoes according to whether they need mending on the sewing machine, polishing with the brush or washing in the machine. The program is full of home comforts, presented with lots of imagination, that young children will enjoy.

Although the animations in this package are very comical, there are a lot of them and our young testers would have preferred more games.

Considering the price, Cosmic Family is good value. As an introduction to the computer, children will find it more endearing than programs that remind them they must learn their ABC.

Debbie Davis

PCW Details

Price £14.99
Contact Ubisoft 0181 944 9000
www.ubisoft.co.uk
System Requirements Windows 95, P90 or higher, 16Mb RAM, CD-ROM.
★★★★☆

Little Mermaid Print Studio

Design delight for children with this project package from Disney studios.

Following on from The Little Mermaid Story Studio, this package is one of many print studios designed by Disney. Children can choose from 20 projects such as designing party banners, greetings cards, picture frames and bookmarks. A simple click on an image or pattern will automatically transfer to the design, making each project easy to use. Icons like Print, Preview, Text and Exit are clearly labelled to avoid confusing young minds. This also means that you can allow children to play happily without adult supervision.

In five of the projects, including the calendar and certificate sections, kids can make use of the new photo-ready feature where personal snapshots can be imported from your own computer files and added to your creations. There are more than 150 different images, backgrounds and borders featuring Ariel, Flounder and Sebastian, each one drawn to Disney's standard.

The stationery would be better printed with a colour printer but I doubt whether children will complain about colouring-in the pictures. You can buy the CD-ROM but you can also get it free if you buy a Lexmark 100 Colour Jetprinter.

This package is certainly enough to keep your child entertained, and I guarantee it will be used over and over again.

Etelka Clark

Below Mark your pages with Ariel
Below, left Personalise a greetings card

PCW Details

Price £29.99
Contact Disney Interactive 0181 222 1571
www.disney.co.uk/disneyinteractive
System Requirements Windows 3.1 or higher, 486 PC, 8Mb RAM, 2X CD-ROM.
★★★☆☆

DK World Atlas

Spinning 3D globe, virtual flights, video clips… this is no run-of-the-mill atlas.

This atlas is different to any other I have seen. As well as a real-time spinning 3D globe, it also has a private web site with a vast list of selected URLs relating to your specified country.

Once you have entered your selected section you can learn anything, from economics to resources, environment, tourism, education and politics. In some sections there are pie-chart presentations that give you a clearer idea of figures, and you can compare these charts with those of other countries.

The Amazing Journeys section is fabulous. You select a country and take a narrated "flight" through the skies above the land. These flights are in fact just moving satellite pictures, but they are truly stunning. The video section is similar to this and shows you 30-second clips of prominent points or events that make countries or capitals famous (e.g. Australia has the Great Barrier Reef, while London has Trooping the Colour).

Left Pie charts compare countries' statistics
Below The video section shows you clips of the prominent features of countries or capital cities

Yes, this atlas does have maps and they are very impressive. Even more detailed than your ordinary map, the Eyewitness Atlas has keys that indicate figures for population and land height, and there is an interactive ruler that can measure exact distances between towns or countries.

This Atlas is education and map reading rolled into one. Adults and children alike can benefit from this pleasurable CD.

Etelka Clark

PCW Details

Price £29.99

Contact Dorling Kindersley 0171 753 3488
www.dk.com

System Requirements Windows 95, IBM-compatible PC, 75MHz Pentium processor, 16Mb RAM, 16-bit sound card, 4X CD-ROM drive.

★★★★☆

Dance eJay

Get mix-master mania! Use this fun CD to make music, using your own PC.

Hey Daddy-o, lay me some skin (that's how us musicians talk, you know, or so someone with a violin once told me). I've got my baseball cap on back to front and us cool cats at *PCW* are laying down some fat tunes.

Oh, sorry! I don't know what came over me. I think it must be something to do with Dance eJay, the package that turns your PC into an 8-track recording studio. It is so deceptively simple to use that even a four-year-old could have a number one smash hit. The colourful interface is great for kids: bass, drums, voice clips and rap samples are colour coded for quick access.

By a simple process of dragging and dropping any of 1,350 original samples onto the screen, you can quickly and easily build up your own dance hit with little or no musical experience. You can record your own samples to increase the range and give it a personal touch, or download add-on packs from the internet.

Of course, if you just stick with the samples supplied you do risk making the same tune as everyone else who might be using it. But having said that, Dance eJay is great fun and it only took me half a morning of noisy creativity to make a prospective Christmas number one hit. Now where's that contact at Radio 1…?

Above, right Just drag and drop to create next week's number one in the pop charts!

Nik Rawlinson

● *See the mini review in Hands On Sound, p293*

PCW Details

Price £24.95

Contact FastTrack 01923 495496
www.fasttrack.co.uk

System Requirements Windows 3.1, 486DX33, 8Mb RAM, 2X speed CD-ROM, 16-bit sound card.

★★★★☆

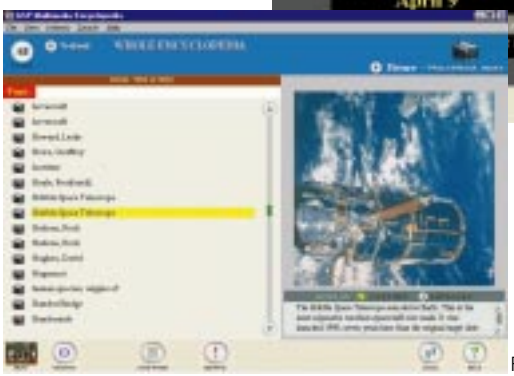
GSP Encyclopedia

Everything you wanted to know about… well, just about anything, really.

This is version two of the GSP Encyclopedia and it contains a wealth of information. It is ideal for fact-finding in schools or simply for general interest. There are over 36,000 articles and each can be printed in full colour using a desktop printer.

The Audio section gives users the chance to listen to a range of items; from music by Chopin to an account of the D-Day landings in Normandy. This is a particularly interesting section and you may find yourself spending hours on it.

If you are a student who is no good at handing your essays in on time, or maybe you can't even be bothered to write them, help is at hand. The Essay section archives around 150 pieces of written work by professionals and will no doubt prove extremely handy!



Above "And here was the news…": the On This Day section
Left 3,632 articles are available

The Country Facts File is a new addition to the World Atlas section and provides information on 190 countries. The Atlas has three levels of zoom and is linked to relevant articles about the country or region in which you are interested.

On This Day informs you of events that happened in the past: for instance, you can find out when a certain famous person may have died, or which well-known people share your birthday. The package also includes 45 video clips and 3,500 pictures.

This encyclopedia may be cheap, but you won't be disappointed.

Michael Murphy

PCW Details

Price £19.95 (upgrade £6.99)
Contact GSP 01480 496575 www.gspltd.co.uk
System Requirements Windows 3.1 or Windows 95, IBM-compatible PC, 8Mb RAM, CD-ROM drive, SoundBlaster audio card.
★★★★☆

Eyewitness History 2

The 3D spinning globe is your link to people and places throughout history.

The new, fully revised version of Dorling Kindersley's (DK) History of the World has a new interface and includes information on events right up to 1997. Like the Eyewitness World Atlas, this package features a 3D spinning globe that leads you into the history of countries when you click in the correct places. Other sections include Country History, which provides an overview of 79 countries, from the earliest human habitation to the present day. There are also links to related articles and biographies.

There is a History Quest quiz that challenges you to explore six topics, including Monuments and Great Rulers. You have to find the answers that are hidden throughout the CD.

You can learn about inventions, weapons, transport and medicine through the centuries, and there are narrated video clips of demonstrations against apartheid and for

Left Watch the video of a demonstration for women's rights by clicking in specific places

women's rights. One section concentrates solely on war and, accompanied by video clips, tells the stories behind the Six Day war and the Gulf war, among others.

A Who's Who database has over 200 new biographies. Everyone from Pericles and Amenhotep III, to Boris Yeltsin and Benazir Bhutto, are included.

Another interesting and well thought out package by DK. An excellent reference for any child studying history at school.

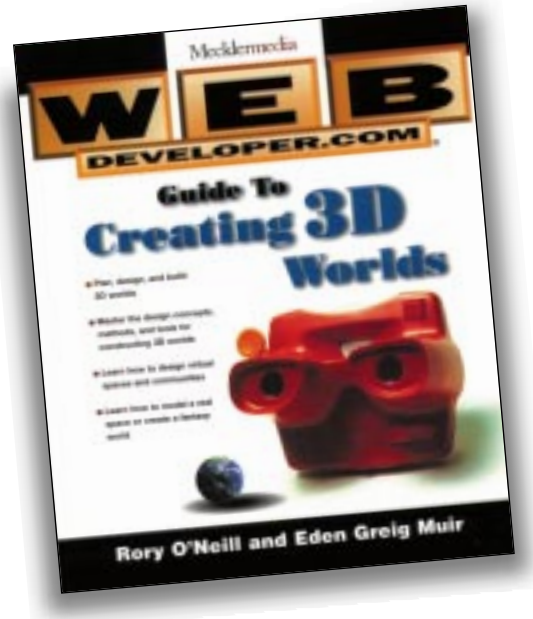
Etelka Clark

PCW Details

Price £39.99
Contact DK Multimedia 0171 753 3488 www.dk.com
System Requirements Windows 95, 486 PC, 33MHz processor, 12Mb RAM, 8- or 16-bit sound card.
★★★★☆

Books

How to make intelligent web pages or create a 3D world on your web site. And meet Ratbert and Asok in Scott Adams' new Dilbert book.



Creating 3D Worlds

Virtual reality is one of the hot topics on the web and many people would love to know how to enhance their web site, turning it into a three-dimensional space. *Creating 3D Worlds* boasts a lot on its covers: an innovative approach that dispenses with VRML, learn how to create and model spaces, and master design concepts and tools. And, like any self-respecting computer book, there's a CD included.

The book is something of a disappointment, however. Experienced site designers don't really need a tutorial on creating imagemaps, and even the inexperienced are likely to notice that some sections of the book are repeated almost verbatim in successive chapters. It seems like padding.

Yes, you can learn something about CAD techniques and gain an understanding of how the different nodes of a world might interrelate, and the way in which different viewpoints can be used to varying effect. Although much is made of the authors' own RAVE engine, designed to take a lot of effort out of making a virtual space, the details actually merit just a short chapter towards the end of the book. Less repetition and more guts would have been better.

The promises made for the CD-ROM don't really hold up, either. Yes, you could use the images to make your own world — if you want it to look just like theirs. The HTML templates could conceivably come in handy, but they're limited in scope and will only save you a few hours' work. And the links to web sites don't all work. For a book that goes on so much about using CAD, a demo application might have been nice, rather than references to a "mid range" package costing $1,500.

All in all, the amount of real, useful information contained in this book was a disappointment. If padding is what it takes to get a commission to turn out this sort of stuff, can I have one, please, Mr Wiley?

Nigel Whitley

Guide to Building Intelligent Web Sites with JavaScript

Have you ever wanted to make your web pages interactive? Are you sick of receiving unfiltered form-filled email back from your site and looking for a way of making sure that only those submissions matching a certain criteria reach your mailbox?

The *Guide to Building Intelligent Web Sites with JavaScript* could be the book that shows you how to overcome these irritating limitations of conventional web sites. Assuming no prior knowledge of JavaScript nor any type of programming experience, this book is ideal for the first-time JavaScript developer. The first chapter

provides a useful definition of JavaScript: that it is a scripting language designed for smaller applications than those that would be written with Java; and that it is, for the most part, interpreted by the reader's browser in much the same way as everyday HTML commands.

Screenshots are plentiful, more than adequately demonstrating the effects of the sample code. And for those who want to give their fingers a rest, each of the programming sections are available on an accompanying web site. Without the need to enter the code themselves, users can instantly interact with the book's content. This means that the applets can not only be examined but also saved to a local hard drive for incorporation into your own web sites. To make use of these resources you need nothing more than a copy of Netscape Navigator version 3 or above, while programming can be done in any standard ASCII text editor.

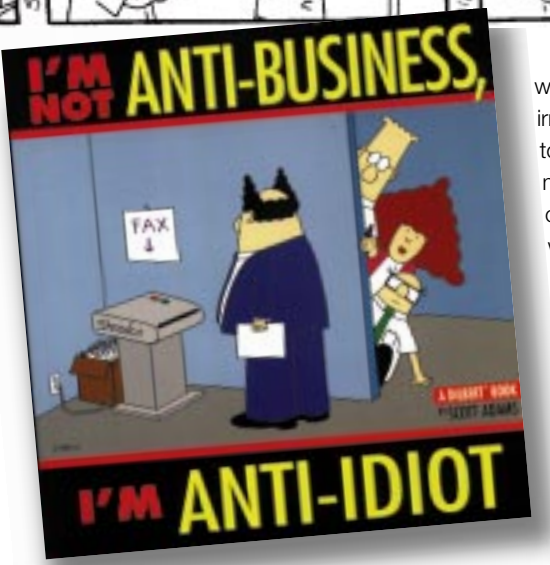
The hands-on approach of this book, in 11 easy-to-follow sections, makes it ideal for study over a short period of time. It gives the reader a comprehensive and easy-to-understand crash course in the basics of the language before working up to complex issues involving server-side applications.

Much of the book is compressed for quick reference into Appendix A. This useful chapter will help those who have already studied the remainder of the volume by refreshing the basic JavaScript concepts and running through a comprehensive list of objects, their methods, properties and event handlers.

Nik Rawlinson

I'm Not Anti-Business, I'm Anti-Idiot

Ah, the halcyon days of youth. Remember when you first confidently proclaimed to your mum and dad, "I am going to be Prime Minister"? Or a writer, or a spy? The world was your oyster and everything was possible! Whatever happened, you had no doubt that the working world would prove to be just as exciting and satisfying as your current career of tormenting your siblings and barbecuing ants with a magnifying glass.



When the day finally came for your work experience, you excitedly set off with your packed lunch and bus fare. But it soon dawned on you that the working world consisted of little more than being forced to clean out stationery cupboards, stuff thousands of envelopes and hunch over the photocopier for eight hours a day. Never mind, you thought. You knew you would be the exception to the rule, that you would make a fabulous and fulfiling living solely from your tortured poetry and Brechtian Super 8s of your goldfish. Sadly, university only postponed the inevitable crushing realisation that there are very few lucky people who love what they do for a living. The rest just pay the bills and mark time.

Sound familiar? Then you're probably already acquainted with Dilbert, the patron saint of angst-ridden cube dwellers everywhere. Just as no office is complete without its wilted hydrangea and irritating sales staff, it now also seems to be corporate policy to have a faintly mutinous selection of Scott Adams' cartoons displayed at each workstation. Adams' latest book continues in the same vein as previously, detailing the trials and tribulations of life at the bottom of the corporate heap. We are introduced to Ratbert, vice president of marketing, and the luckless new intern, Asok. You'll cheer as Dilbert narrowly escapes being sentenced to death by Catbert, the Evil Human Resources Director! You'll tremble as Dogbert announces his candidacy for Supreme Ruler of the Universe! And you'll almost have to take comfort in the fact that, no matter how bad your job is, it can't be as bad as this.

Susan Pederson

PCW Details

Creating 3D Worlds
Author Rory O'Neill and Eden Greig Muir
Publisher John Wiley & Sons
ISBN 0-471-15944-1
Price £27.50
★★☆☆☆

Guide to Building Intelligent Web Sites with JavaScript
Author Nigel Ford
Publisher Wiley Computer Publishing
ISBN 0-471-24274-8
Price £24.95
★★★★☆

I'm Not Anti-Business, I'm Anti-Idiot
Author Scott Adams
Publisher Boxtree
ISBN 0-7522-2379-8
Price £5.99
★★★★☆

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Buyer's Guide

Sometimes you just want to know the names of the best products, when they were reviewed, how much they cost and where you can get them. That's where our new, no-nonsense buyer's guide comes in.

Over the following four pages we've picked out the outstanding PCs, peripherals and software packages which we can recommend without hesitation. To make it even easier, we've included the current manufacturer's contact number and price (incl.VAT), as well as details about when and where we reviewed the product.

For the full review, why not check out *PCW* on CD-ROM? Updated quarterly on a rolling basis, *PCW* on CD-ROM contains the full editorial from the last 24 issues, in searchable Adobe Acrobat format. It even comes with a copy of Acrobat for viewing, searching and printing.

Each CD costs just £9.95 including postage and packing, or £8.96 for subscribers. Call **01795 414870** to order your copy, or turn to the *PCW* Reader Offers on page 318 for further details.

Gordon Laing, Managing Editor

Personal Computer World Buyer's Charter

IF THINGS GO WRONG

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Anthony George, our Customer Services Manager, is here to help you if things go wrong or if you have a complaint about advertisements that have appeared in Personal Computer World. Write to him with details of the complaint and he will contact you.

Anthony George
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VNU Business Publications
VNU House
32 - 34 Broadwick Street
London W1A 2HG

Anthony George

● Buyer's Charter

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Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated.

Claims received outside this period will not qualify for consideration for compensation under the "Buyers Charter".

After a supplier who has advertised has become subject to either liquidation or bankruptcy proceedings, Personal Computer World guarantees to process as expeditiously as possible those private individual readers' claims made and submitted, in accordance with those procedures outlined, up to the following limits.

a) £2,000 for any one advertiser so affected.

b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publishers maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the discretion of the Publishers.

As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the "Buyers Charter" will be subject to re-processing and will take into account any shortfall which may then exist.

Payments under the scheme will take into consideration the obligations and liabilities of other interested parties such as credit card and/or insurance organisations etc.

This guarantee only applies to advance postal payments made by private individuals in direct response for goods itemised/illustrated in display advertisements. It does not cover goods ordered from inserts, classified advertisements, or catalogues obtained from any advertiser.

The "Buyer's Charter" is designed to safeguard the PRIVATE individual reader. It does not provide protection to any companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. Similarly, cover is not provided for orders placed from or to any overseas companies or for goods purchased for resale.

Entry-level PC: Watford Electronics Aries Multimedia Pro

A decent PC for £599 excluding VAT? Yes, it's possible with Watford's Aries Multimedia Pro. A fairly nifty Cyrix M2 P200 MX processor is accompanied by 32Mb RAM, which is more than sufficient for most tasks. 14in monitors are not normally anything to write home about, but Watford's give a sharp, flicker-free image.
PCW May 1998 p196.
Price £703.82
Contact Watford Electronics
01582 745555

Also Recommended
■ **Linear Computers Linear Excel** *PCW May 1998 p195.*
Price £603.95
Contact Linear 0800 622094

High-end notebook: Gateway Solo 9100

If you're looking for a notebook with all the features of your desktop, then the Solo 9100 from Gateway is your best bet. It has the latest 266MHz Mobile Pentium II chip, but also has 3D graphics, an optional DVD drive and a 14.1in screen, and comes complete with a 56K PC Card modem and MS Office SBE. We liked it so much, we gave it our Editor's Choice award.
PCW June 1998 p187.
Price £3,876.33
Contact Gateway 2000; 0800 282000

Also Recommended
■ **Choice UltraLite Rodeo 5000** *PCW May 1998 p144.*
Price £3,876.33
Contact Choice Systems
0181 993 9003

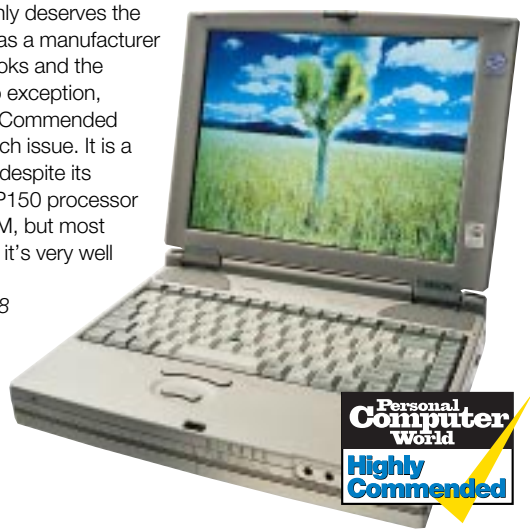
Mid-range PC: Dan Dantum II/W5

This issue's £999 Pentium II group test showed that decent PCs had become extremely affordable. Take our Editor's Choice, the Dan Dantum II, featuring a Pentium II 266MHz processor, 6.4Gb disk, 64Mb RAM, AWE-64 sound, ATi Xpert@Work 3D graphics, 56K modem, decent monitor and good software bundle. A bargain mid-range PC.
PCW July 1998 p145
Price £1,175
Contact Dan 0181 830 1100
www.dan.co.uk

Also Recommended:
■ **Mesh Elite Professional PII**
PCW July 1998 p157
Price £1,145
Contact Mesh 0181 452 1111
www.mesh.co.uk
■ **Viglen Contender II**
(PCW July 1998 p159)
Price £1,175
Contact Viglen 0181 758 7000
www.viglen.co.uk

Mid-range notebook: Toshiba Satellite Pro 440CDT

Toshiba thoroughly deserves the reputation it has as a manufacturer of quality notebooks and the Satellite Pro is no exception, winning a Highly Commended award in our March issue. It is a good performer, despite its modest spec of P150 processor and 16Mb of RAM, but most importantly of all, it's very well built.
PCW March 1998 p183.
Price £2,226.63
Contact Toshiba
01932 828828



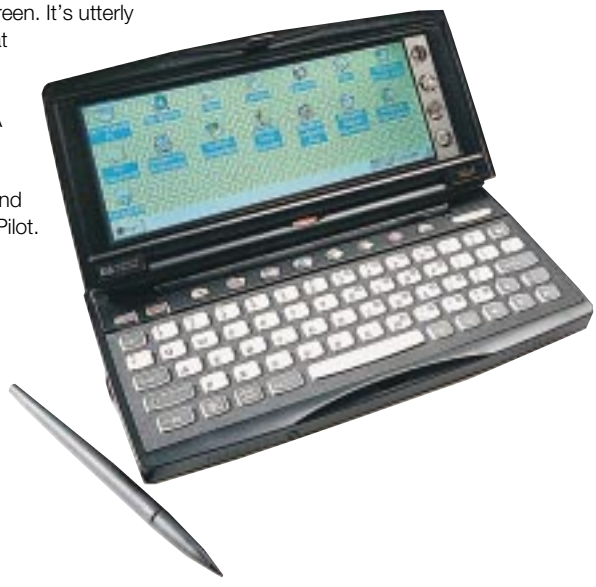
High-end PC: HP Vectra VL

For a truly high-end PC, look no further than one based on Intel's latest and fastest Pentium II processor, the 400MHz. Not only a fast mover internally, it also fits in the new BX chipset motherboards which run your cards and memory 50 percent faster than before. HP's Vectra VL 400MHz system caught our eye before it flew off.
PCW June 1998 p216.
Price £2,353.53
Contact HP
0990 474747

Also Recommended
■ **Carrera Power Pro II** *PCW June 1998 p212.*
Price £3,049.13
Contact Carrera 0171 830 0486

PDA HP 620LX

For cutting-edge technology in your pocket, Hewlett-Packard's 620LX has to be the only choice. It's based on the latest Windows CE2 operating system and is the first PDA we've seen with a colour screen. It's utterly gorgeous and, at £799, a serious threat to many notebooks. PDA fans should also check out the Psion Series 5 and the 3Com PalmPilot.
PCW May 1998 p262.
Price £799
Contact HP
0990 474747



Colour inkjet: Canon BJC-80

Winning Editor's Choice in our last inkjet-printer group test, Canon's BJC-80 didn't fail to impress. Around half the size of a notebook, it's as happy on a desktop as it is on the move, with optional battery and wireless infra-red operation. Canon even offers a cartridge with a tiny (albeit slow) built-in scanner, offering still greater flexibility.

PCW January 1998 p147.

Price £233.83

Contact Canon 0121 680 8062

Also Recommended

■ **Canon BJC-4650** *PCW April 1998 p80.*
Price £327.83 **Contact** Canon 0121 680 8062

■ **HP DeskJet 720c** *PCW March 1998 p82.*
Price £270.25 **Contact** HP 0990 474747

Colour photo printer: Epson Stylus Photo

Specifically designed for printing photographic images although more than acceptable at text and business graphics, Epson's Stylus Photo is an undeniably impressive device. In addition to the standard CMYK cartridge, the Stylus Photo employs additional light cyan and light magenta ink, giving truly photorealistic output.

PCW September 1997 p145.

Price £233.83

Contact Epson 01442 61144

Also Recommended

■ **Alps MD-2300 Masterpiece** *PCW September 1997 p142.*
Price £645.08
Contact Alps 0800 973405

Budget laser printer: Panasonic KX-P6300

A decent laser printer at under £200 excluding VAT? That's Panasonic's KX-P6300, which not only turns out great results in fast time, but also boasts one of the smallest footprints of any printer. Its unusual vertical design, along with being a great-value all-rounder, earned it Editor's Choice in our last entry-level laser group test.

PCW February 1998 p194.

Price £217.38

Contact Panasonic 0500 404041

Also Recommended

■ **Kyocera FS-600** *PCW February 1998 p189.* **Price** £280.83
Contact Kyocera 01734 311500

■ **Minolta PagePro 6** *PCW February 1998 p192.*
Price £351.33 **Contact** Minolta 01908 200400

Business laser printer: HP LaserJet 4000TN

King of the laser printer, Hewlett-Packard has impressed us yet again with its latest office machine. Being 25 percent faster than the LaserJet 5, with 10,000-page toner cartridge, two 250-sheet input trays, network interfaces as standard and boasting superb output, the 4000TN should be the first choice as an office workhorse.

PCW February 1998 p77.

Price £1662.63

Contact HP 0990 474747

Also Recommended

■ **QMS DeskLaser 1400P** *PCW March 1998 p82.*
Price £938.83
Contact QMS 01784 442255

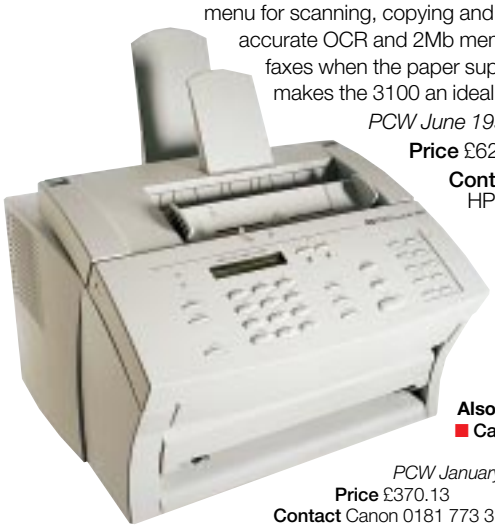
Multifunction device: HP LaserJet 3100

Good laser-print quality from this quiet machine. Intelligent enough to detect a document dropped into its feeder, it will launch an idiot-proof menu for scanning, copying and emailing. Fast, accurate OCR and 2Mb memory for incoming faxes when the paper supply is exhausted, makes the 3100 an ideal multifunction device.

PCW June 1998 p83.

Price £629

Contact HP 0990 474747



Also Recommended

■ **Canon MultiPASS MPC20** *PCW January 1998 p78.*
Price £370.13
Contact Canon 0181 773 3173

Flatbed scanner: HP ScanJet 6100C

The 6100C's software is quick and easy to use, while the bundled slide adapter makes 35mm transparency scanning a breeze. The 6100C is a SCSI device, comes with an interface card, and offers 600dpi optical or 2,400dpi interpolated resolution. It may have a slightly large footprint but offers great value for money.

PCW May 1998 p154.

Price £708.83

Contact HP 0990 474747

Also Recommended

■ **Umax Astra 610P** *PCW February 1998 p115.*
Price £98.70
Contact IMC 01344 871329

■ **Microtek Phantom 4800** *PCW February 1998 p113.*
Price £146.88
Contact Midwich Thame 01379 649200

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Digital camera: Agfa ePhoto 1280

Digital cameras have improved vastly over the last year and probably the greatest leap forward is in the introduction of mega-pixel cameras. The best of these is the Agfa ePhoto 1280, with its maximum resolution of 1,280 x 1,024 pixels and a 3x optical zoom lens equivalent to a 38 to 114mm lens on a standard 35mm film camera.

PCW February 1998 p85.

Price £650

Contact Agfa
0181 231 4906

Also Recommended
■ **Kodak DC210** *PCW December 1997 p82*. **Price** £586.32
Contact Kodak 0800 281487
■ **Sony DSC-F1** *PCW January 1998 p221*.
Price £457.07 **Contact** Sony 0990 424424

Monitor: Nokia Multigraph 447Za

No matter what you do, it's vital to get a good monitor with a clean, flicker-free display. In April 1998's group test we looked at 17in models and found Nokia's Multigraph 447Za to be the best in our entry-level category. Those with more to spend should check out the Mitsubishi, below, which won Editor's Choice in the high-end section.

PCW April 1998 p204.

Price £440.63

Contact Nokia
01793 512809

Also Recommended
■ **Mitsubishi DiamondPro 700**
PCW April 1998 p208. **Price** £569.88
Contact Mitsubishi 01707 276100

Modem: BT Prologue K56EV Plus Modem

This smart little K56Flex modem features a headset, allowing it to be used as a hands-free telephone. Add a pair of speakers and you've got a full duplex speakerphone. The K56EV also supports AudioSpan Simultaneous Voice and Data (SVD) operation, allowing voice and data to be transmitted at the same time.

PCW July 1998 p80

Price £119.95

Contact Direct Source
0118 981 9960
www.btwebworld.com/tmd/

Also Recommended:
■ **Pace 56 Voice**
(*PCW November 1997 p219*)
Price £139
Contact PMC 0990 561001

Removable storage: Iomega Zip drive

Let's face it, your hard disk is never big enough and those files you want to copy to a floppy always end up being just over 1.5Mb. Enter removable-cartridge storage devices. We recommend Iomega's almost ubiquitous Zip drive, taking 100Mb disks which cost around a tenner each. Bigger thinkers should turn to the Jaz, below, which stores 1Gb on fast £70 cartridges.

PCW August 1997 p163.

Price £101.05

Contact Iomega
07000 466342

Also Recommended
■ **Iomega Jaz** *PCW August 1997 p163*.
Price £233.83
Contact Iomega
07000 466342

Sound card: Terratec EWS64 S

A cut-down version of the heavyweight EWS64XL, Terratec's S model still boasts much of the same sampling and processing capabilities and is also a great games card with accelerated DirectSound and positional 3D audio. There's a digital I/O option, upgradeable sample memory and the decent software bundle includes Cubasis AV.

PCW July 1998 p210.

Price £149.23

Contact Terratec 01600 772111
www.terratec.co.uk

Also Recommended:
■ **Creative Labs AWE 64 Gold**, (*PCW July 1998*)
Price £129.25
Contact Creative Labs 01245 265265,
www.cle.creaf.com

Graphics card: ATI Xpert@Play

For the best games performance you absolutely need a 3D graphics card. While the new 3DFX Voodoo 2 cards (*see below*) offer the best high-end performance, ATi's Xpert@Play card is a great entry-level choice. Note that at the time of writing, ATi only supplies Direct 3D drivers for Windows 95, so no Quake using OpenGL just yet.

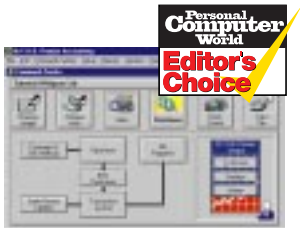
PCW December 1997 p188.

Price £139.83

Contact ATi 01628 533115

Also Recommended
■ **Creative Labs 3D Blaster Voodoo2** *PCW June 1998 p85*.
Price 12Mb £229, 8Mb £179
Contact Creative Labs
01245 265265, www.cle.creaf.com

Accounting: MYOB



Ideal for the owner-manager and good for bookkeepers too, Mind Your Own Business (MYOB) is our choice for accountancy software. We also recommend TAS Books which offers good bookkeeping and very powerful analysis. *PCW June 1998 p198*. **Price** £229.13 **Contact** Bestware 01752 201901

Also Recommended ■ **TAS Books** *PCW June 1998 p203*. **Price** £116.33 **Contact** Megatech 01372 727274

Personal Finance: Microsoft Money Financial Suite 98

Microsoft Money Financial Suite 98 is our choice for personal finance. It offers online banking and updating facilities, and Sage compatibility, at a bargain price. *PCW January 1998 p91*. **Price** £49.99 **Contact** Microsoft 0345 002000

Also Recommended ■ **Quicken 98** *PCW June 1998 p209* **Price** £39.99 **Contact** Intuit 0181 990 5500

Database: Borland Visual dBase 7

The first 32-bit version of Borland's classic database manager is a significant upgrade from version 5.5, and a must-have for dBase developers so long as 16-bit compatibility is not required. Access is particularly good value when bought with Office 97 Pro. *PCW March 1998 p92* **Price** £292.58 **Contact** Borland 01734 320022

Also Recommended ■ **Microsoft Access 97** *PCW October 1997 p196*. **Price** £276.13 **Contact** Microsoft 0345 002000

DTP: Serif PagePlus 5

Inexpensive, easy to use and surprisingly well equipped. PagePlus 5 offers extremely capable desktop publishing. Those wanting the choice of professional publishers will have to fork out more for Quark XPress 4.0. *PCW June 1998 p132*. **Price** £99.95 **Contact** Serif 0800 376 7070

Also Recommended

■ **Quark XPress 4** *PCW June 1998 p125*. **Price** £1169 **Contact** Quark 01483 454397

Image Editing: Adobe Photoshop 5

With version 5, Photoshop is better than ever, although some web designers will want a little more. The legendary Paintshop Pro and fun PhotoDeluxe cater at entry level. *PCW June 1998 p88*. **Price** £763.75. **Contact** Adobe 0181 606 4001

Also Recommended ■ **Adobe PhotoDeluxe 2**, *PCW December 1997 p87*. **Price** £57.58 **Contact** Adobe 0181 606 4001 **Paintshop Pro 4** *PCW December 1997 p212*. **Price** £58.69 **Contact** Digital Workshop 01295 258335

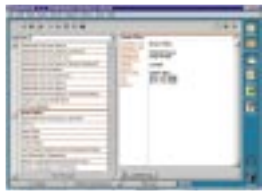
Drawing: CorelDraw 8

Not one of Corel's classic years, but still the Windows drawing package to own. Version 8 of the giant suite boasts better drawing and new interactive tools. Budget drawers should check out the Micrografx Windows Draw 6. *PCW January 1998 p88*. **Price** £464.13 **Contact** Corel 0800 973189

Also Recommended ■ **Windows Draw 6** *PCW December 1997 p89*. **Price** £49.95 **Contact** Micrografx 01483 747526

Information managers: Starfish Sidekick 98

The best personal information manager boasts wide customisability as its greatest strength. For heavyweight contact management, look no further than Goldmine 4 (*details below*). *PCW May 1998 p156*. **Price** £39.99 **Contact** Starfish 0181 875 4455

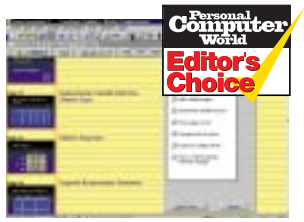


Also Recommended

■ **Goldmine 4** *PCW April 98 p88*. **Price** £229.13 **Contact** AVG 0171 335 2222

Presentation graphics: Lotus Freelance 97

Our choice for electronic presentations. It may also come down to which office suite you own or are considering. As part of Microsoft Office 97, PowerPoint won't let you down. *PCW March 1998 p200*. **Price** £49.35 **Contact** Lotus 01784 445808



Also Recommended ■ **MS PowerPoint 97**, *PCW March 1998 p202*. **Price** £325.47 **Contact** Microsoft 0345 002000

Programming tool: Symantec Visual Café 2

Visual Café 2 is the most productive visual Java tool and has the option of native-code compilation for Windows. Windows developers should go for Borland Delphi 3 which, although more complex, comes into its own on larger applications. *PCW April 1998 p177*. **Price** from £79 **Contact** Symantec 0171 616 5600

Also Recommended ■ **Borland Delphi 3** *PCW April 1998 p183*. **Price** from £95.18 **Contact** Borland 01734 320022

Remote Access: Symantec pcAnywhere 8.0

Takes the lead in remote access software. Remote controllers should also consider the legendary LapLink, now on version 7.5. *PCW January 1998 p104*. **Price** £166.33 **Contact** Symantec 0171 616 5600

Also Recommended ■ **LapLink 7.5** *PCW November 1997 p126*. **Price** £176.25 **Contact** Traveling Software 01753 818282

Web design: SoftQuad HotMetal Pro 4.0

An excellent all-rounder, HotMetal Pro 4 gets our thumbs up for web design. For a slick interface and Office 97 integration, Microsoft's FrontPage 98 is worth a look. *PCW January 1998 p196*. **Price** £123.38 **Contact** SoftQuad 0181 387 4110.

Also Recommended

■ **FrontPage 98** *PCW January 1998 p195*. **Price** £116.30 **Contact** Microsoft 0345 002000

■ **Adobe PageMill 3.0** *PCW May 1998 p158*. **Price** £92.83 **Contact** Adobe 0181 606 4001

Anti-Virus: Norton AntiVirus 4.0

AntiVirus 4.0 is our choice for protecting your PC. It offers the best combination of features and performance. *PCW April 1998 p124*. **Price** £49 **Contact** Symantec 0171 616 5600

Also Recommended ■ **Dr Solomon's HomeGuard** *PCW April 1998 p122*. **Price** £29 **Contact** Dr Solomons 01296 318700

■ **F-Secure 4.0 AntiVirus** *PCW April 1998 p122*. **Price** £109.27 **Contact** Portcullis 0181 868 0098

Reliability survey

Service and Reliability Survey 1998

PCW is conducting a study of how well your PCs and printers function in the real world. We know what the manufacturers say. We know what our lab tests reveal. But how do the various models perform in the trenches? And how satisfied are you with the hardware, and the shops and manufacturers which sold them to you? How does the after-sales service live up to your expectations?

PCW has joined forces with Maritz Research, leader in the field of Customer Satisfaction testing, in an effort to compile and deliver the ultimate performance guide to computer equipment. Please fill in the questionnaire which follows. Share your experience with us, in confidence, and we will produce a comprehensive report on computer reliability and customer service. The results will appear in our November 1998 issue, so look out for them. Fill in the questionnaire and return it to the address on page 183, by Friday 15th May, and the first 1,000 respondents will receive a free CD-ROM containing the 24 most recent issues of *PCW* (CD features April 96 - March 98 inclusive).

How to fill in your questionnaire

There are a number of questions which ask you to indicate your satisfaction using a five-point rating scale, where 5 is very satisfied and 1 is very dissatisfied. Please feel free to use any number between 1 and 5.

To return your completed questionnaire, cut out the pages or photocopy them, and use the freepost address given at the end of the questionnaire or contact the VNU web site for online completion <www.vnunet.com>. Many thanks for your participation.

Maritz Research is an independent agency conducting research on behalf of VNU into finding out how reliable you think your PC products are. Your opinion would be appreciated in order to highlight the strongest and weakest areas of reliability. Maritz Research is bound by the Market Research Code of Conduct, guaranteeing respondent confidentiality.

(1) ABOUT YOUR DESKTOP OR LAPTOP

PC 1

What make is your PC? (See panel below)
1 Desktop 2 Laptop
3 Other

Model and processor spec. .....
Year purchased .....
Place of purchase
1 Mail order/direct from vendor
2 Superstore/high street retailer
3 Dealer/value added reseller
9 DK
Is this PC located at...?
1 Home
2 Work
3 Both
9 Other
What is it mainly used for?
1 Business & personal use
2 Personal use only
3 Business use only
4 Home-based business

PC 2

What make is your PC? (See panel below)
1 Desktop 2 Laptop
3 Other

.....
.....
1 Mail order/direct from vendor
2 Superstore/high street retailer
3 Dealer/value added reseller
9 DK
1 Home
2 Work
3 Both
9 Other
1 Business & personal use
2 Personal use only
3 Business use only
4 Home-based business

(1b) Satisfation — delivery and installation

How satisfied are you with the...?

	Very dissatisfied				Very satisfied	Very dissatisfied				Very satisfied
Availability of the product for delivery when desired	1	2	3	4	5	1	2	3	4	5
Delivery date was met	1	2	3	4	5	1	2	3	4	5
Condition when received	1	2	3	4	5	1	2	3	4	5

PCs 1 Compaq; 2 IBM; 3 Packard Bell; 4 Dell; 5 Gateway; 6 Hewlett-Packard (HP); 7 Toshiba; 8 Dan Technology; 9 Mesh; 10 Fujitsu; 11 Elonex; 12 Apricot Mitsubishi; 13 Digital; 14 OT Technology; 15 Viglen; 16 Evesham; 17 Atlantic Systems; 18 Northwood; 19 Simply; 20 Quantex.
Printers 1 HP; 2 Canon; 3 Lexmark; 4 Epson; 5 NEC; 6 QMS; 7 Oki; 8 Brother; 9 Fujitsu; 10 Panasonic.

PC1

Delivery completeness	1	2	3	4	5
Ease of installation	1	2	3	4	5
Compatibility with other hardware	1	2	3	4	5

(1c) Satisfaction — usage

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Quality of the machine	1	2	3	4	5
Standard of features	1	2	3	4	5
Standard of software	1	2	3	4	5
Ease of use	1	2	3	4	5
Performance/speed	1	2	3	4	5
Ability to upgrade	1	2	3	4	5
Price/performance value	1	2	3	4	5
Manuals	1	2	3	4	5
Warranty	1	2	3	4	5

(1d) Reliability

How many problems have you had with your PC in the last 6 months which limited your use of it? (If more than 10 please write amount)

1 None
2 1-5
3 6-10
4 10+
5 .....

Using the following comments please classify the type of problems you experienced (circle all that apply)

1 Dead on arrival
2 Failure due to hard drive component
3 Failure due to sound card component
4 Failure due to video card component
5 No display at all
6 Failure due to virus
7 Failure due to RAM
8 Problems with insufficient memory
9 PC would not boot up
10 PC freezes or hangs for a long time
11 Problems caused by the software
Please give details of problems below:
.....
.....

How were the main problems rectified? (circle all that apply)

Provided by place of purchase
1 Telephone/helpline support
2 Electronic (email/web) support
3 Fax support
4 PC repaired on-site
5 PC returned and repaired
6 PC replaced
Other: .....
Provided by manufacturer
7 Telephone/helpline support
8 Electronic (email/web) support
9 Fax support
10 PC repaired on-site
11 PC returned and repaired
12 PC replaced
Other: .....

(1e) Repair service

If you had a repair performed on your PC, how satisfied are you with the...?

	Very dissatisfied				Very satisfied
Repair service	1	2	3	4	5
Time taken for the repairs	1	2	3	4	5
Quality of the repairs	1	2	3	4	5
Cost of repairs	1	2	3	4	5

(1f) General aspects

How satisfied are you with the overall reliability of your PC?

Very dissatisfied				Very satisfied
1	2	3	4	5

What is the likelihood of you repurchasing the same brand in the future?

Definitely not				Yes definitely
1	2	3	4	5

What is the likelihood of you recommending this brand to your colleagues/friends?

Definitely not				Yes definitely
1	2	3	4	5

If you rated 1 or 2 to any of the last 3 questions, what are your main reasons for low satisfaction, not repurchasing and/or not recommending?
.....

PC2

1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

Very dissatisfied				Very satisfied
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

1 None
2 1-5
3 6-10
4 10+
5 .....

1 Dead on arrival
2 Failure due to hard drive component
3 Failure due to sound card component
4 Failure due to video card component
5 No display at all
6 Failure due to virus
7 Failure due to RAM
8 Problems with insufficient memory
9 PC would not boot up
10 PC freezes or hangs for a long time
11 Problems caused by the software
Please give details of problems below:
.....
.....

Provided by place of purchase
1 Telephone/helpline support
2 Electronic (email/web) support
3 Fax support
4 PC repaired on-site
5 PC returned and repaired
6 PC replaced
Other: .....
Provided by manufacturer
7 Telephone/helpline support
8 Electronic (email/web) support
9 Fax support
10 PC repaired on-site
11 PC returned and repaired
12 PC replaced
Other: .....

Very dissatisfied				Very satisfied
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

Very dissatisfied				Very satisfied
1	2	3	4	5

Definitely not				Yes definitely
1	2	3	4	5

Definitely not				Yes definitely
1	2	3	4	5

If you rated 1 or 2 to any of the last 3 questions, what are your main reasons for low satisfaction, not repurchasing and/or not recommending?
.....

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(2) ABOUT YOUR PRINTER

Brand
1 HP 4 Apple
2 Canon 5 Lexmark
3 Epson 6 Panasonic
Other: .....

Model specification .....
Year purchased .....
Type of technology
1 Laser/LED
2 Inkjet
3 Dot matrix
4 Dye sublimation
5 Thermal
6 Other: .....
9 Don't know

Colour or mono
1 Colour
2 Mono
3 Colour capable
9 Don't know

(2a) Satisfaction — delivery and installation

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Availability of the printer	1	2	3	4	5
Delivery date was met	1	2	3	4	5
Condition of printer	1	2	3	4	5
Ease of installation	1	2	3	4	5
Compatibility with hardware	1	2	3	4	5

(2b) Satisfaction — usage

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Quality of the machine	1	2	3	4	5
Standard of features	1	2	3	4	5
Standard of software	1	2	3	4	5
Ease of use	1	2	3	4	5
Performance/speed	1	2	3	4	5
Print quality	1	2	3	4	5
Paper-handling capabilities (e.g. paper types, paper jams)	1	2	3	4	5
Price/performance value	1	2	3	4	5
Ability to upgrade	1	2	3	4	5
Manuals	1	2	3	4	5
Warranty	1	2	3	4	5

(2c) Reliability

How many problems have you had with your printer in the last 6 months
1 None 3 6-10
2 1-5 4 10+
5 ..... (if more than 10 please write amount)

Using the comments below please classify the type of problems you experienced (circle all that apply)
1 Dead on arrival
2 Failure due to printer driver
3 Failure due to memory problems
4 Would not print
5 Unavailability of support/helpline
6 Ribbons/cartridges fitted incorrectly
7 Continual jamming of paper
8 Significant variation in shades produced when printing in colour
Please give details of the problems in the space provided.
.....
.....
How were the main problems rectified? (circle all that apply)
Provided by place of purchase
1 Telephone/helpline support
2 Electronic (email/web) support
3 Fax support
4 Printer replaced
5 Telephone/helpline support
6 Electronic (email/web) support
7 Fax support
8 Printer repaired on-site
9 Printer returned and repaired
10 Printer replaced
Other: .....
If you had a repair performed on your printer, how satisfied are you with the...?

	Very dissatisfied				Very satisfied
Overall repair service	1	2	3	4	5
Time taken for the repairs	1	2	3	4	5

Quality of the repairs	1	2	3	4	5
Cost of repairs	1	2	3	4	5

(2d) Cost

How satisfied are you with the running costs of your printer?

	Very dissatisfied				Very satisfied
Overall cost of ownership	1	2	3	4	5
Cartridges/toner/ribbons	1	2	3	4	5
Paper and other medias	1	2	3	4	5
Powersave features	1	2	3	4	5

What are your average monthly consumable costs?

1 Less than £20
2 £20-£40
3 £40-£60
4 £60-£80
5 £100+
9 Don't know

(2e) General aspects

How satisfied are you with the overall reliability of your printer?

Very dissatisfied				Very satisfied
1	2	3	4	5

What is the likelihood of you repurchasing the same brand in the future?

Definitely not				Yes definitely
1	2	3	4	5

What is the likelihood of you recommending this brand to your colleagues/friends?

1	2	3	4	5

If you rated 1 or 2 to any of these questions, what are your main reasons for low satisfaction, not repurchasing and/or not recommending?

(3) INTERNET SERVICE PROVIDER

Name of provider .....

What is it mainly used for?

1 Web access
2 Email
3 Both
4 Other

(3a) Satisfaction — delivery and installation

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Ability to connect when desired	1	2	3	4	5
Speed to access provider	1	2	3	4	5
Ease of setup	1	2	3	4	5
Proximity of 'local' access tel lines	1	2	3	4	5

(3b) Reliability

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Overall reliability of provider	1	2	3	4	5
Ease of installation	1	2	3	4	5
Value for money	1	2	3	4	5
Quality of service provided	1	2	3	4	5
Connection speed	1	2	3	4	5
Response to problems	1	2	3	4	5

(3c) General aspects

How satisfied are you with the...?

	Very dissatisfied				Very satisfied
Technical support offered	1	2	3	4	5
Quality of online content	1	2	3	4	5
Availability of search engines	1	2	3	4	5

What is the likelihood of repurchasing from this ISP in the future?

Definitely not				Yes definitely
1	2	3	4	5

What is the likelihood of you recommending this ISP to your colleagues?

Definitely not				Yes definitely
1	2	3	4	5

If you rated 1 or 2 to any of the last 3 questions, what are your main reasons for low satisfaction, not repurchasing and/or not recommending?

.....

Please complete the following details and return the questionnaire to:
Maritz Research (VNU), FREEPOST SL1673, Marlow SL7 1BT

Name: .....
Address: .....
.....
..... **Postcode:** .....
Email address: ..... **Tel no:** .....

How often do you purchase PCW and/or What PC?

1 I am a subscriber to PCW ☐
2 I am a subscriber to What PC? ☐
3 Not a subscriber ☐

How would you best describe your professional role?

1 General Manager/MD ☐
2 IT Manager/Director ☐
3 Technical Support Manager/Executive ☐
4 Purchasing Manager/Executive ☐
5 Other non-IT position ☐
6 Home use ☐

ChipChat

The lovely Hank: a class act, obviously

Surfers rank Hank at number one

The American rag, *People Magazine*, has had a bit of a shock. Its online 50 Most Beautiful People In The World 1998 Awards have been turned over in a display of nationwide email rebellion. Hank the Angry Drunken Dwarf has received approximately ten times more votes than the favourite for the award, golden boy Leonardo DiCaprio.

Hank the Angry Drunken Dwarf is a regular on shock jock Howard Stern's television show, and tens of thousands of fans have emailed the People Magazine Online awards in an attempt to have him proclaimed the Most Beautiful Person in the World. Hank was unavailable for comment, but perhaps his warm character is best reflected by one of his most famous utterances: "I got class, you don't even have an ass".

Switch on and fork off

Another blessing of life this side of the pond is the lack of Bad Manners. No, not the popular eighties band, creators of such gems as Fatty Fatty and Don't Knock the Baldheads; *ChipChat* has more than a passing fondness for their chirpy ska ballads. The manners of which we speak are tied up with class and, indeed, the very essence of Britishness itself.

A report in the *Sunday Times* details the activities of one Lyndy Janes, an etiquette teacher from London. As well as training etiquettes (small, hairy, French pigs) she is tutoring the cream of American geek executives in basic table manners.

The initiative stems from the execs' fear of losing multimillion dollar deals because their Far East customers have a much stricter code of etiquette. The geeks "come in Armani jackets and Rolex watches and then commit the cardinal sin of poor table etiquette," says Lyndy.

ChipChat applauds any effort to civilise our North American cousins, but suspects that even Ms Janes' best efforts will not be enough to compete with the thrill of eating with the remarkable Buster Bloodvessel.

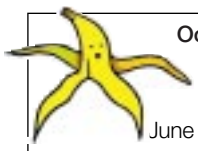
Legs eleven

A regular ChipChat reader (and this just shows what it does to you) writes: "*I bought one of those new iMacs last month and feel completely ripped off. It cost over a thousand times as much as my usual bottle of depilatory cream and I can't even get the top off. And as if this were not enough, I'm going on holiday next week: I'll need two suitcases just for the iMac! Please help.*"

Hairy Harry of Harlow

ChipChat replies: Dear Hairy, we suspect that answering your question would simply expose you to more ridicule. We have therefore sent the solution in a plain brown wrapper, marked "Intensely Personal", to your mother's address.

● Incidentally, ChipChat is currently experimenting with the reverse scenario: using a bottle of Immac as a computer. Inexpensive, lightweight and battery-free, its only drawback seems to be the "spurt" factor. Anyone who has ever sat heavily on an uncapped bottle will know what we mean, although this obviously can't apply to Hank the Angry Drunken Dwarf. The omission of "Hairy" from his otherwise splendid title remains one of the great mysteries of the universe. ■



Oops!

■ The review of the Sharp HC-4100 in the June issue (First Impressions) wrongly stated that the palmtop has a 33.6Kbps software modem. The modem is in fact only available on the US version of the machine.

■ The spine on the June issue says Volume 21 No 4. This should have read Volume 21 No 6.

Caption competition

"Me and the rest of the Village People are going to the Space Bar. Do you want to come?…"

Think you can do better? Enter via our web site at www.pcw.co.uk or write to the usual address (p10) with your caption(s) on a postcard marked "July Caption Competition" before 26 June. We'll print the funniest entry and the winner will receive a £20 book token.

Left Congratulations to Mike Fawe, of London. He's the winner of May's caption competition, with this: "… and this one's the millennium bug."